

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The "Challenge" Rock-Breaker.

There are few American machines which have been so generally introduced abroad as the rock crusher, and if it be true that numerous imitations indicate merit, the Blake crusher has certainly attained a high order of perfection. Yet the old form of the Blake crusher possessed some drawbacks which, in some cases, made it more favorable to use rolls. The castings were very heavy, as they were used to resist strains for which cast iron is an unfavorable material. The Blake Crusher Company, of New Haven, Conn., have therefore introduced recently an improved style of machine, which possesses features giving it an enlarged field of utility. In the accompanying illustrations, Fig. 2 shows the parts of the machine, while Fig. 1 is a perspective view. As will be seen, the general principle of the operation of the breaker is the same as with the older form, the improvements extending to a number of details, by the introduction of which the weight has been very considerably reduced. Power is applied by the pulley E, steadiness of motion being assisted by two fly-wheels, a strong pitman, H T, transmitting the motion to the toggles O. The pitman itself is so constructed that it can be lengthened or shortened, and the inclination of the toggles can be adjusted at will, thereby permitting any desired variation of the distance between the movable jaw T and the stationary jaw F. By the movement of the pitman the movable jaw is forced against the other, crushing the material thrown into the space between them. The jaw is carried back to its original position by the action of the rubber spring L, which has also an important function in preventing breakage by cushioning sudden blows. The jaw opening can be adjusted readily, by means of the nuts N, on the steel tension rods R R, the main toggle block B not being cast in one piece with the stationary jaw as formerly, but being separate from it. This allows a ready adjustment for crushing coarse or fine, and secures one great advantage, particularly important to the mining camps of our Western States and other localities remote from the great highways of travel. It divides the machine up into a larger number of smaller pieces, so that transportation over mountain trails of poor country roads is made possible. The weight of the heaviest piece of a crusher 15 x 9 inches is now about 2400 lbs., instead of almost 8000 lbs., as it was formerly. Strong steel clamps, C, hold the jaw shaft in place. The jaws have an exchangeable lining. The machine, which is the invention of Mr. T. A. Blake, is very cleverly designed, with a full appreciation of the nature of the great strains to which it is exposed, and a wise choice of the best materials to resist them.

SCIENTIFIC AND TECHNICAL.

Some startling facts were brought to light recently during

THE TRIAL OF THE 80-TON GUN

at Woolwich. After testing it with charges of 445 pounds of powder and a projectile weighing 1750 pounds, which were probably discovered to be excessive, the gun, which has a caliber of 16 inches, and a chamber of 17 inches in diameter, was tried for its range and time of flight with a charge of 425 pounds, and a projectile of 1700 pounds. On the first day, says *Engineering*, 10 rounds were fired, viz., five at 1 degree elevation, and five at 3 degrees. The range at the lower elevation varied from 1121 to 1147 yards; the maximum difference being 26 yards; the time of flight was 2.3 seconds. At 3 degrees elevation the range varied from 2525 to 2583 yards; the maximum difference being 58 yards; the time of flight varied from 5.2 to 5.5 seconds. On the second day it was proposed to fire several rounds with Palliser and common shell, in order to compare the shooting powers with each description of projectile, and further to test the effect of loaded shrapnel on targets erected at 200, 400, 600 and 1000 yards, and arranged to represent brigades of infantry in open order, but the experiments were brought to an untimely end after the first round. It was observed that the copper gas check became detached from the projectile, immediately after the latter left the muzzle of the gun, and pursuing a trajectory of its own, landed some 250 yards to the left, near some men who were working in a brickfield. It subsequently transpired that several of the gas checks on the previous day had behaved in the same erratic fashion, and it was consequently decided that the gun was too dangerous to be fired any more, and so the experiments were brought to a close. These gas checks were, as we have always been informed, meant to put muzzle-loaders on a par with breech-loaders by hermetically closing the bore of the gun in front of the powder gases. A gas check as applied to the 80-ton gun is a copper plate weighing 20 pounds, which, when the gun is fired, is supposed to expand itself into the grooves, and also into the edge of the base of the projectile, which is serrated in order to make it stick. It appears, however, from recent experience, that it is liable to prove more dangerous to friends than to foes, just as the 33-ton muzzle-loader of the Thunderer did. In this case, as in every other, the authorities who have taken upon themselves the defense of the nation, were warned before-

hand what would happen, but they turned a deaf ear. Sir W. Palliser drew their attention to the dangerous character of the service gas check, and pointed out the American ring check invented by Captain Butler, U. S. A., which had answered perfectly with the heaviest ordnance in the States, and which, being somewhat of the nature of a Bramah collar, cannot give way. But the advice was not taken.

Mr. Richard Proctor, the eminent English astronomer, in a recent lecture spoke briefly of

A NEW THEORY REGARDING THE PYRAMIDS. He stated that some time since he endeavored to place himself in the position of those making astronomical observations without the assistance of telescopes, with the object of studying their requirements and the best methods possible with the means at their command. The result was a structure very similar to the pyramids, which he believes were obviously built originally for astronomical purposes. He exhibited a section of one of the great pyramids, and called particular attention to two galleries ascending toward the north and the south, which must have served the purpose now fulfilled by the transit instrument indicating the exact moment when the leading stars were in the meridian.

M. Trouvé, a well-known French electrician, has recently devised some

ELECTRICAL ORNAMENTS

which are novel. He has applied electricity to a number of trinkets and ornaments. For instance, of two scarf-pins one has a death's-head, gold or enamel, with diamond

& Co., the Lucy and Isabella furnace companies have also contracted for large quantities. The discovery was made accidentally, but it will inure to the benefit of iron manufacturers in this immediate vicinity.

Death of a Noted Ironmaster.

The death of Mr. F. H. Oliphant, which occurred last week, demands more than passing notice. Mr. Oliphant was born on the 4th of January, 1800, at old Fairfield Furnace, on Georges Creek, Fayette County, within two miles of where he died. All that is now left to mark the location of this furnace, which was two miles above the Fairchance Furnace, and on the same stream, is the cinder pile and some of the stones with which the stack was built.

The father and grandfather of the subject of this sketch were among the early ironmasters of Western Pennsylvania, their first venture in iron-making being the renting of the old Fairfield Furnace. Some time about 1790 his father, Col. John Oliphant, bought the Fairchance Furnace from its builders, Hayden & Nicholson. At the age of 16 he entered the office of his father and kept the books of Fairchance Furnace until 1823. In that year he took charge of the Little Falls Iron Works, on the Youghiogheny River, just opposite Dawson's Station, which his father had bought from the Gibsons. Here, from pigs made at Fairchance, he manufactured all kinds of bar iron, which he disposed of at Pittsburgh. Through indorsements for friends, Col. Oliphant was for a time in financial distress. The sheriff levied on

Co., of Pittsburgh), bought in all the kegs they could get containing Oliphant's brand. These kegs they filled with nails of their own manufacture, and of an inferior quality, which they sold as of Fairchance manufacture, and at a less price than Mr. Oliphant himself could afford to sell for.

In 1835 the Philadelphia Academy of Science offered a prize for the best specimen of pig iron made with coke. Although Fairchance was a cold-blast charcoal furnace, Mr. Oliphant set about to win the prize if possible. In the winter of 1836 his patience and ingenuity were rewarded. He sent his specimen to Philadelphia, where it is still on exhibition; but the prize, notwithstanding it had not been carried off, was refused him on the ground that the period within which it should have been won had expired. It is claimed that this was the first coke pig iron ever made in Western Pennsylvania.

About 1870 Mr. Oliphant sold two-thirds of the Fairchance and Springhill Furnace properties, embracing 10,000 acres of land, to a company of New York capitalists for \$200,000. Not wishing to retire entirely from the business, he retained a one-third interest, but soon sold them his remaining third for \$90,000, and moved to Uniontown. Here he lived in quietude for awhile, but after so many years of toil and activity idleness proved uncongenial. Although the winter of life had whitened his locks, he determined to signalize the close of a busy career by building another furnace. He carried out his intention. Oliphant Furnace, two miles north of Fairchance, is the result. It proved a bad investment. The times were unpropitious, and in this enter-

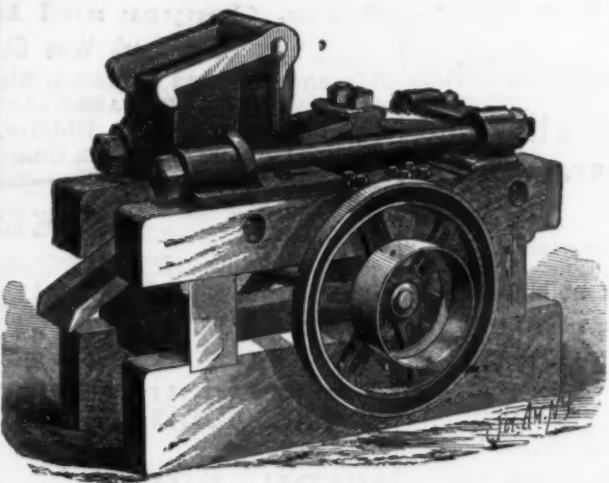


Fig. 1.—Perspective View.

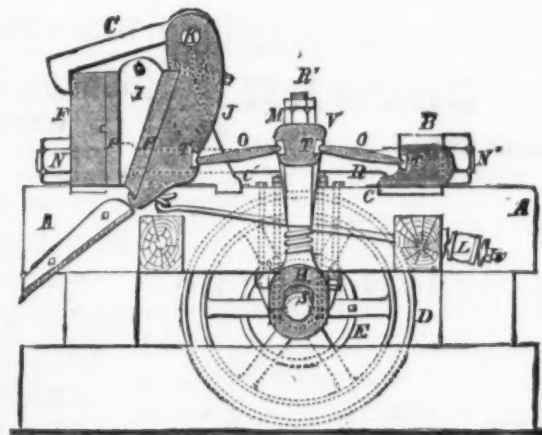


Fig. 2.—Longitudinal Section.

THE "CHALLENGE" ROCK BREAKER.

eyes and an articulated jaw; the other has a rabbit seated upright on a box with a little bell before it, to be struck with two rods held in the animal's forepaws. An invisible wire connects these objects with a small hermetically closed battery, the ebonite case of which is about the size of a cigarette. It is kept in the waistcoat pocket, and acts only when turned horizontally or inverted. When a person looks at the pin, the owner, slipping a finger into his pocket, moves the battery, whereupon the death's-head rolls its eyes or grinds its teeth, or the little rabbit beats the bell with its rods. A third kind of ornament is a small bird set with diamonds, to be fixed in a lady's hair, and the wings of which can be set in motion electrically.

To those whose memory is not retentive of figures, Mr. Richard A. Proctor recommends the following

FORMULA FOR THE DISTANCE OF THE PLANETS FROM THE SUN.

which gives a close approximation: Write down the figure 4 several consecutive times, and then add 0, 3, 6, 12, 24, doubling the number each time. We have then

4	4	4	4	4
0	3	6	12	24
4	7	10	16	28, &c.,

each figure representing, in millions of miles, the distance of the planets in their order, the third (10) being that for the earth. This rule holds good until Neptune is reached, for which the result is much too large.

It is said that a valuable deposit of limestone has recently been discovered about a mile from the Edgar Thomson Steel Works, which will be operated by A. J. Prentiss & Co. Its locality will allow shipments by rail and river to all the blast furnaces in the vicinity of Pittsburgh. Inclines have been constructed to deliver either in railway cars or in boats, and already the firm operating the quarry have received some of the largest contracts ever made by the blast furnace companies. The limestone is said to be of superior quality, the analysis showing but 0.0034 per cent. of phosphorus and but 8 per cent. of magnesia, with 85 per cent. of pure lime. The Edgar Thomson Steel Company have contracted for 500,000 bushels, while Laughlin & Co., Moorehead

Fairchance Furnace, and in 1826 advertised it for sale. The men of the community, understanding the circumstances of Col. Oliphant's difficulty, refused to attend the sale. The only bidder present was his son, the subject of this sketch, who, in order to legalize the sale, sent for Peter McCarty and Benoni Freeman to bid against him. Mr. Oliphant now had Little Falls and Fairchance both under his management.

Such was his great energy that frequently after a severe day's labor at Little Falls, he would in the evening mount his horse and ride 20 miles after night to Fairchance. The next day he would spend in examining in the condition of Fairchance, financial and otherwise, and upon the recurrence of night again return to Little Falls. Some time after the purchase of Fairchance he erected a rolling mill in connection with it, and converted into nails, nuts, rivets and bar iron all the pig metal yielded by the furnaces. In 1828 he sold the Little Falls works to Miltenberger & Co., of Pittsburgh. Conceiving that Pittsburgh offered advantages in his business which could not be obtained in Fayette County, he came here after making the sale noted, and in company with other parties built the Pennsylvania Rolling Mill. He also engaged in steamboating here with James Brading. But eventually Mr. Oliphant returned to Fairchance, where he made his reputation, and with which his name is most prominently connected. His industry and enterprise kept the boundaries of his trade constantly widening. His iron was not surpassed in quality anywhere. A keg of nails needed only his brand to guarantee it a ready sale. He had agents in Pittsburgh, Cincinnati, Louisville and St. Louis, and established stores in Uniontown, Connellsville, Brownsville, Fairmont, Morgantown, Cumberland and Frostburg, for the exclusive sale of his own manufactured products. When the old National road was in the zenith of its glory, and tavern stands and blacksmith shops were almost as numerous as its iron mile-stones; when buildings were rapidly multiplying in response to the imperative demands of a rapidly enlarging traffic, Oliphant's iron and nails were used almost from end to end of this great artery of commerce. His less successful competitors in business sought by unfair means to turn his popularity to their own advantage. The Ellicotts, who operated Fridevale Furnace, on Cheat River (which property is now owned by Chess, Smyth &

price was dissipated the fortune which the sale of the Fairchance property yielded him.

METALLURGICAL NOTES.

UTILIZATION OF GASES FROM THE BESSEMER CONVERTER.

Messrs. Brown, Bayley & Dixon, of Sheffield, have introduced into their Bessemer works a meritorious and simple method for utilizing the gases and the flame issuing from their converters, for heating the blast of their cupolas for remelting the pig, thus considerably reducing the expense of fuel for an operation which many metallurgists, notably those of Europe, consider wasteful when compared with the method of carrying the melted pig direct from the blast furnace. The upper part of the converter stack is covered over, and the flame and hot gases enter through a side opening into the first of two chambers of a hot-blast stove, placed on the side of the upper part of the blowing stack. The passage of the hot gases is regulated by two dampers, placed, one on the top of the blowing stack, and the other on the top of the hot-blast stove and over its second chamber. In each of the two chambers are eight U-shaped tubes, 16 feet in length, and having a total heating surface of 1712 square feet, the cupolas to which the stoves must bear some ratio, being capable of holding 24 tons of metal. The diameters of these cupolas, of which there are two for each converter, inside the lining are: At the tapping hole level, 5 feet, tapering inward to 4 feet at the bottom tuyeres, 5 feet above the tapping hole. This diameter is preserved for about 5 feet, and from thence it increases to 4 feet 6 inches at the charging hole level, this diameter being maintained to the top of the cupola; the total height is 37 feet. Hot-blast stoves are attached to each of the converters, and the pipes, valves and mains are arranged so that the cold blast may be passed through either stove on its way from the blast engine to the cupolas, according as the one or other converter is blowing. The blast is heated to from 400° to 500° F. The records of several thousand tons of pig show that the consumption of coke varied from 1 cwt. 33 lbs. to 1 cwt. 48 lbs. per ton of iron, including all the coke used for getting the cupolas into working condition. The saving effected is claimed to amount to 1½ cwt. per ton of iron.

DEPHOSPHORIZATION IN GERMANY.

The Hoerder Huetteneverein, of Dortmund, Westphalia, Germany, was one of the first works in Germany to begin a series of experiments with the Thomas process. The results, it would appear, have been favorable in a metallurgical sense. A very low grade of pig iron has been used, containing an average of 1.4 per cent. of phosphorus and about an equal amount of silicon. In some charges a white pig, containing nearly 2 per cent. of phosphorus and but little over 1 per cent. of silicon, has been employed. The phosphorus in the steel produced from this pig is reported to average .06 per cent., the silicon in all cases being eliminated entirely. The steel produced is said to be of high quality, has in every case rolled and forged well, and has given the most satisfactory results when tested under a falling weight and in the testing machine. It may be mentioned that the metal has always been sufficiently hot, notwithstanding the low percentage of silicon in the charge. That a very high percentage of phosphorus and a low percentage of silicon are no obstacles to the successful conversion of pig into Bessemer steel of the best quality under the Thomas process, is again confirmed by these results.

FIGURES FOR THE CONVERSION OF METRIC TO ENGLISH STRESS UNITS.

Those who have frequently occasion to refer to Continental works of reference or technical journals, find it a very inconvenient matter to compare the figures giving the results of mechanical tests. The following figures may prove valuable to them in the necessary calculations:

1 millimeter.....	=	0.03937	.....Inches
1 inch.....	=	25.4	.....millimeters.
1 square millimeter.....	=	0.00155	.....square inch
1 square inch.....	=	645.16	.....sq. millimeters.
1 kilogram.....	=	2.2046	.....pounds
1 pound.....	=	0.4535	.....kilograms
1 kilo. per sq. mm.....	=	147.06	.....lbs. per sq. in.

MULTIPLIES.

1.....	147.06
2.....	294.12
3.....	441.18
4.....	588.24
5.....	735.30
6.....	882.36
7.....	1029.42
8.....	1176.48
9.....	1323.54

1 pound per square inch = 0.007 kilograms per square millimeter.

One kilogram per running meter is very nearly one-half pound per running yard, so that the weight of rails given in kilograms can be quite easily converted into pounds per running yard.

ETCHING SECTIONS OF IRON.

Prof. K. Keller, in an essay on the flow produced in punching iron, repeating Townsend's well-known experiments, used a method for etching sections of iron in order to reveal its structure, that he claims to be superior to those used hitherto—a statement which appears to be borne out by the excellent illustrations which accompany his article. He employs a very dilute solution of chloride of platinum, which is poured into a flat dish. The piece to be etched is placed into it face downward. The only precaution necessary is to carefully remove any trace of fatty substances, which is done either by washing with ether or by grinding with very fine emery and washing with water. In order to prevent rusting, the prepared section surface is given a coat of any animal oil absolutely free from acid.

A PURE IRON.

The Eames petroleum process, which is being used regularly at the Eames Iron Works, Titusville, Pa., in the manufacture of blooms, appears to render the production of a pure iron possible. The following is an analysis of iron produced, the analysts being Profs. Henry Wurtz and W. M. Habirshaw:

Total carbon.....	0.043	Iron.....	99.913
Phosphorus.....	faint trace		
Sulphur.....	0.0001	Total.....	100.013
Silicon.....	0.0002		

Analyses of the ore from which this pure metal was made would be of much interest, as affording a good opportunity to ascertain the nature and extent of the elimination of the impurities.

The depression of business in England is declared by recent correspondents to be very deeply rooted. The railroad companies complain that they have very little agricultural produce to carry. The North British Railway reports a falling off of £1600 per week on the goods-traffic. In many localities the potato crop is almost an entire failure. One station reported usually ships over 300 car-loads of potatoes, but this year shipped only two. To show how intimately all industries are connected together, it is stated that, owing to the hard times, the demand for candles has much diminished, and almost all purchased are of the cheaper styles. During the week which ended Sept. 20th, sales of home-grown wheat in the British markets were 53,000 quarters, as against 242,000 quarters during the corresponding week of 1878; if the whole month be taken, the deliveries of wheat have been restricted to 245,000 quarters, as against 807,600 quarters in the previous years. The quantity of wheat which has been imported into England during these four weeks has been 6,522,308 centals, and her imports of flour during the same period have been 720,712 centals. In round figures, the English wheat importations have doubled since 1876, while the English home produce has in the same period decreased by two thirds.

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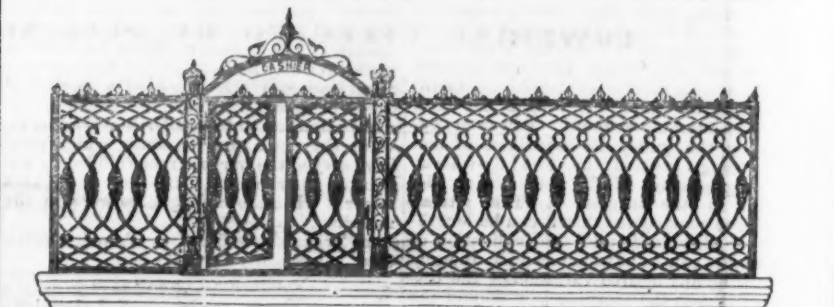
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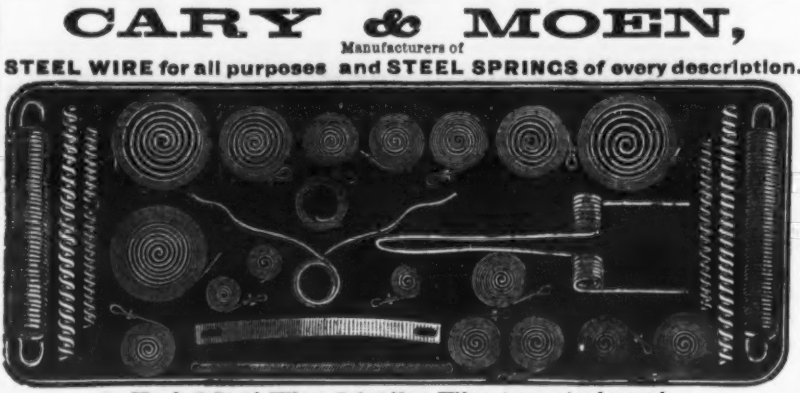
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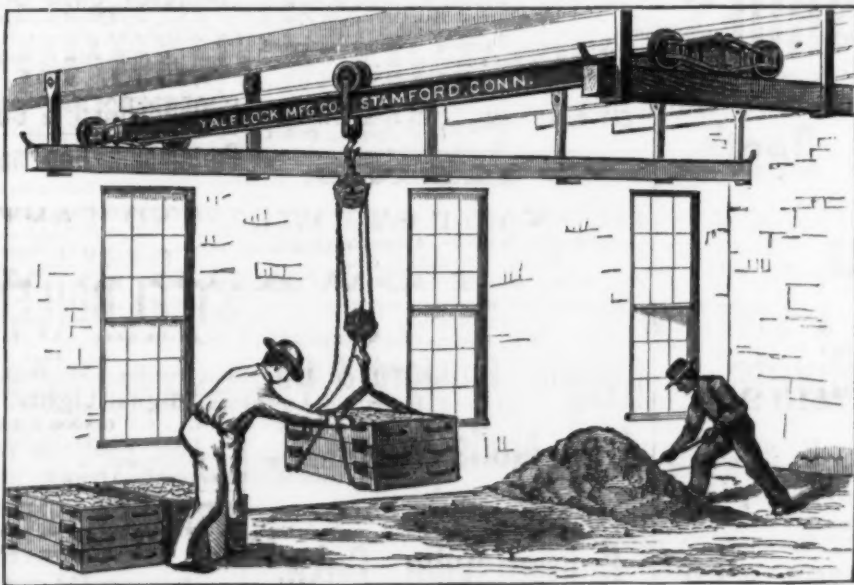
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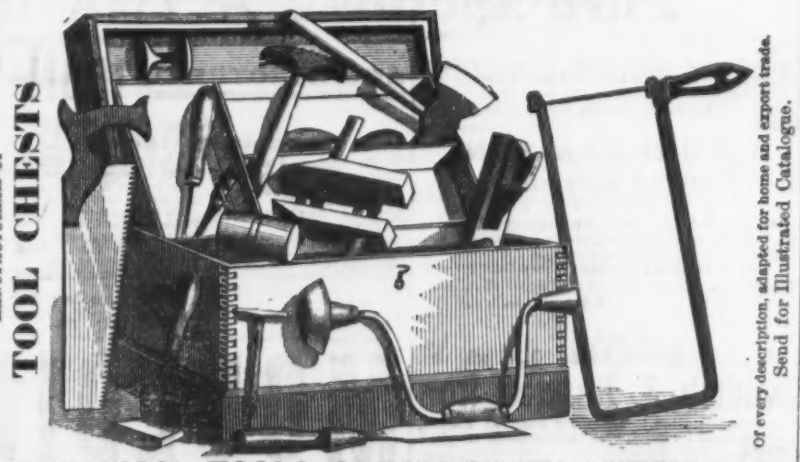
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Banca and Billiton.

Since the discovery of rich and extensive tin mines in Australasia, the world is not so largely dependent for supplies of tin upon the product of the East Indies; but the importance of the latter countries as producers of the metal is such that some data gathered by Dr. E. Reyer, and published in the *Oest. Zeitschr. f. Berg. u. Hüttenwesen*, will be of interest. The island of Banca may be considered as the continuation of the mountains of Malacca, its geological formation being similar. It consists of several masses of granite, which is generally coarsely crystalline and occasionally graduates into syenite. These masses of granite are flanked by argillaceous slates and quartzites belonging to the Silurian age, and strongly metamorphosed at their contact with the granite. The tin stone is found disseminated throughout the granite and the stratified rocks which overlie it, and it is a general rule that the latter are richer than the granite, which sometimes contains veins.

It is not, however, from this, the original source of the ore, that the tin is obtained, the entire product of the island being drawn from washings or placers. The rocks, notably the stratified deposits, are decomposed by the action of air and water, and, crumbling to pieces, are washed down into the valleys, where they are found as alluvial deposits. Tin stone, which resists this action, is found disseminated throughout these masses of debris unchanged, and it is obtained from these by washing. The ore so gathered is reduced by smelting.

The history of tin mining in Banca reaches back to the beginning of the last century, metal having first been discovered in 1710 by the burning of a village, in the ashes of which globules of tin were detected. The Sultan of Palembang, to whom the island belonged, is said to have gathered enormous wealth from an industry which grew very rapidly, the production having reached almost 4000 tons in 1740. He forced the Chinese miners to deliver the tin to him at a price fixed by himself, and then sold it to the Dutch for double the sum. The result was inevitable, and in 1780 the production fell to 2000 tons per annum in consequence of this extortion, continuing to decline until 700 tons only were turned out in the beginning of this century. In 1811 the island was ceded to England, but the tin trade remained in the hands of the Dutch, in accordance with a special treaty between them and the Sultan of Palembang. The latter, it appears, was himself as unmercifully fleeced by the Dutch as he imposed upon the miners. The shrewd Hollanders consented to pay him \$6 to \$8 per picul, while they sold it in China for \$15 to \$20. During the second decade of this century, however, the Sultan appears to have been crowded out, the Dutch having in 1821 seized the island by force of arms. We find them paying the miners two thirds of the value of the tin, and retaining the rest for themselves, which as production had risen to 2000 tons per annum, was quite a handsome revenue. Half of this quantity was shipped to China, which took besides the same share of the output of Malacca, estimated at that time at 1500 tons per annum. The following figures are thought to give approximately the production per annum during this century:

	Tons.
1800-09.....	1500
1810-19.....	2700
1820-29.....	4100
1830-39.....	3200
1840-49.....	4700
1850-59.....	4700
1860-69.....	4400
1870-77.....	4400

The methods of working the deposits have undergone some change during the last ten years. Formerly small companies of Chinese miners prospected the streams with the aid of a peculiar tool, and having found a favorable locality they notified the Dutch officials, who examined the ground and made advances for tools and provisions. The company was then organized and commenced, first, the construction of a dam and ditches along both the slopes of the valley. From the latter, branches led directly into the bed of the stream. Then a long and deep washing trench was dug, and into this the whole of the loose material was washed. The amount of tin thus obtained does not average more than half a ton per annum for every miner; in the Soengseian district it was 0.6 ton on an average during the period of 1850 to 1870. The most favorable results were obtained in the washings at Blinjee, where an average of 1 ton per miner was reached. Washing cannot of course be continued throughout the whole year. In the washings situated in the higher portions of the stream it lasts 5 months only, while further down the valley as much as 8 months' time is reached.

The washed tin stone is then smelted, the furnaces being 4½ feet high, 10 feet long and 3½ feet wide. A hole, through which the metal is allowed to flow off, leads to the center of the bottom of the furnace. It accumulates in a well in front of the furnace. One clay tuyere at the back is supplied with air by a simple horizontal pump, the cylinder of which is made of the hollowed trunk of a tree. The furnace is filled twice with charcoal and blown until the whole has reached a high heat, when the ore is thrown in without any flux. Each furnace, which is only run at night on account of the heat, produces about 1½ tons per shift. After running four nights the furnace is relined. The ore is divided into three classes: Coarse ore with a reddish tinge, holding from 72 to 74 per cent. of metal, coarse black ore receiving from 50 to 64 per cent., and fine black sand which yields only 25 to 30 per cent. of metal, and is not considered fit to be smelted. It is stated that 7 tons, or 70 per cent., are obtained from 10 tons of high-grade ore with a consumption of fuel of 7 tons.

Such are the primitive methods used by the Chinese and Malays, but gradually they are now being superseded by better and elaborate European methods, introduced by the Dutch. The entire system is undergoing a change. Chinese adventurers, miners who join to form small companies working for their own account, are less numerous, and

the Dutch are forced to work the mines themselves with hired Coolies. A very important fact is that the washings are growing poorer, so that their working is less profitable. The result, a reduced output, is becoming already evident in the decline exhibited by the statistics given in the above.

While Banca is thus beginning to experience the fate of all placer mining, Billiton has fairly entered upon the first period of rapid development characterizing the working of stream deposits. Although some efforts were made by the Dutch as early as 1827 to open out the reported riches of the island of Billiton, the determined opposition of its inhabitants, a small number of fishermen and pirates, prevented any successful operations. It was only about the year 1850 that Billiton is first mentioned as a tin producing country, the output being only 40 tons in 1853, 60 tons in 1854, and not averaging more than 180 tons for the whole decade. This was enormously increased, however, soon after the Société Anonyme pour Billiton secured the monopoly. In 1862 the production was 360 tons; it rose to 730 tons in 1863, to 800 tons in 1864, to 1000 tons in 1865, and went beyond 2000 tons since 1867. During the years 1870 to 1876 an average of 3600 tons per annum were placed on the markets of the world. The population of the island increased in a corresponding ratio, rising from 14,000 in 1860 to 28,000 in 1876. There were only 400 Chinese miners in 1860, 1400 in 1864, 2000 in 1865, 3000 in 1870 and 4300 in 1873. Since then, however, there has been a decline—4200 in 1874 and 3500 in 1875 and 1876. In 1872 there were at work 113 placers, of which four produced from 100 to 300 tons each, eight made 60 tons per annum, 16 more than 30 tons, 25 about 15 tons each, while 59 turned out less than that amount, the average for the greatest number being about 10 tons per annum. Geologically, Billiton does not differ from Banca, but it has been noticed that the washings are rich only in the upper portions of the streams, where the fragments of quartz are not yet abraded by the grinding action of being conveyed along the beds of the rivers by the water. There seems to have been some attempt to work the rock tin—that is, the original deposits. Mr. Rant, a Dutch government engineer, reports that in 1865 he conducted explorations on a large impregnated zone, finding that 25 per cent. of the rock mined averaged 10 per cent., while more than three-quarters of the stream works do not yield more than 4 per cent.

The Art of Japanning.

Japan painting is a distinct artistic profession, and has been one of the industrial arts that has frequently led up to fine art, having educated in its time more artists than any other. It has been to many the threshold over which they have passed into the great temple of art, and more than one English Royal Academician has graduated in the japanner's workshop. In the early days of japanning in England articles of japanned iron were awkward and clumsy. Part of this was due to the material used and part to the workmen and designers.

It was difficult, it is true, at first to get iron that would bear bending and twisting, or that would give a smooth, even surface to the decorator, but now the modeler and stamper can twist and bend his material into almost any form his fancy may dictate, and when he sends his work to the decorator, the latter has a free field, and need not fear that his work will be spoiled. Tea trays, coal vases, canisters, &c., are among the staples of this manufacture, and the production is enormous. In Wolverhampton alone, which is the chief seat of the manufacture in England, as many as 100,000 trays and waiters are made in a week. The painting on these used to be done by hand, and so rapidly that it was said that a "skilled artist" could easily paint two gross of landscapes in a day. The common decoration is now done by transfer printing. The pattern or picture is lithographed on fine tissue paper, which is laid face downward on the japanned plate, and adheres to the sticky varnish with which it has been covered. After a little time the paper can be wiped off, but the colors remain and are afterward fixed by baking.

In this country the use of transfer ornaments is very general. In fact, excepting the gilding and striping, the principal decorations upon tinware in this country are almost exclusively transfer ornaments. We have seen oil paintings done upon metal or stone protected by the japan, and rendered much more durable than they could have been if unprotected. Sometimes the artist paints upon porcelain and then has the plate japanned, so that the work very much resembles a piece of porcelain painting, but with some advantages over it in the greater number of colors and greater ease of working.

In England a new decorated tin has come into the market, printed in the sheet, directly on the metal, with such permanency that it can be made up without injury into canisters and other articles, thus very much cheapening the production. We are of the opinion that the goods made up from such sheets will have a very cheap look. Certainly, the ready-made decoration cannot be as well suited to the purpose as those which are applied after the work is made up. Upon the other side of the water the taste in japanned ware has wonderfully improved, as a glance at the old tea trays will show, and an English paper says hopefully, that only in memory do we now find Abraham in red, sacrificing Isaac in blue, on a green altar with a black ground. We fear, however, that a great many of the modern English designs are hardly better than the older ones—at least, it would appear that they are not, if we may believe the illustrations of goods which are published by some of the manufacturers of japanned ware.

The japanning of iron is a very different thing from the real japan ware made in Japan itself and introduced into Europe toward the close of the 17th century. The latter is done very largely on a base of papier-mâché, which is vastly superior to metal or wood, being lighter, sounder and admitting of a more beautiful polish in the finish. Not only is the material different from

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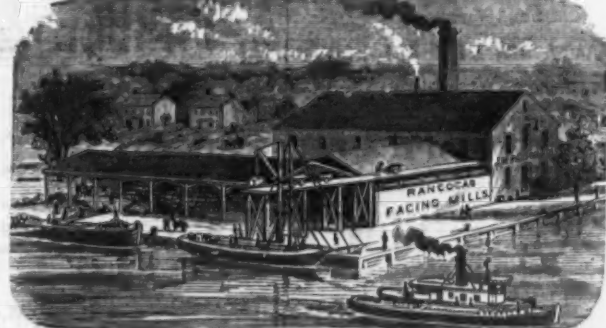
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The cheapness of labor in Japan and China is such that an immense amount of work may be done in the way of polishing the undercoats of Japan so that those on top may flow out smoothly and form a coating as smooth as glass. It has always been a wonder to us that some one in this country has not attempted to make power available for smoothing down the first coats upon varnished, lacquered and japanned articles. It seems to us that it could be as easily done as to arrange buffing and polishing wheels for metal or sand-papering machines for wood. We could then produce all kinds of work much more cheaply than now, and at the same time greatly improve the quality even of our common work. The pumice-stone rubber is at the present time about the only method employed in cutting down the painted body which forms the foundation for the lacquer.

The mode of manufacturing the papier-mache Japan ware may be thus briefly described: Paper of a porous texture is saturated with a solution of flour and glue, and then applied to a mold, somewhat smaller than the object required; these molds are of iron, brass or copper; repeated layers of thin paper are made to adhere by means of the glue; a drying at 100° F. takes place between each coat. When the proper substance is obtained, it is taken from the mold and properly planed and filed to shape; the thickness of the article varies according to circumstances; an ordinary tea tray takes about 10 layers; a tar varnish mixed with lamp-black is now laid on, after which the article is baked and several coats of varnish are applied, followed in each case by a baking. When sufficiently covered with this preparation, the inequalities are removed with pumice-stone, and the work of the artist commences. After he has executed the design, either in bronze powder, gold or color, as may be desired, several coats of shellac varnish are applied, and this is hardened in the stove at a heat of 250° F. The article is now rubbed with rottenstone and oil to obtain a polish, and perfected to a brilliant surface by rubbing with the hand.

which the varnish is made, but the method of application and finishing varies also. Japan stands at the head of the world in the production of the so-called lacquered work which properly bears the name of the country. Even the Chinese, who manufacture some exquisite japanned work, are behind the Japanese in this art. The old lacquer of Japan cannot be surpassed, and the gold work or gold lacquer is beautiful beyond anything of the sort that has been produced elsewhere. Strictly speaking, the Chinese make lacquered work, while the ware from Japan should be properly called japanned ware and not lacquered ware. The reason for this is found in the fact that the Japanese do not use lac or gum lac in producing their japanned work. Their material is a resinous gum derived from a tree which they call Tscishoo (*Rhus vernice* of the botanists), which is very nearly related to the poison oak or poison sumach of our swamps. The sap from which the varnish is made is very poisonous, like that of our poison oak. In China, gum lac, and also some other gums, are used in the production.

Paper is the favorite material among Japanese artists, and from the samples of Japanese work which we have had an opportunity of examining closely, we think that in a very great majority of cases wood and other articles to be japanned are first covered with a fine, smooth, tough tissue paper, which forms a foundation for the Japan. This has the advantage of holding the wood in place and of taking the foundation coats of Japan nicely.

The method of applying the lacquer in China is pursued as follows: The article to be ornamented, if formed of wood, is always very dry, light and smooth; it is first coated with a preparation of ox-gall and rotten stone; this is rubbed to a smooth face, and then varnished. This varnish is thus composed: 605 grains of fine gum lac are put in 1200 grains of water; to this is added 33 grains of oil of Camellia sasauqua, a pig's gall and 10 grains of rice vinegar. The whole is well mixed in full daylight, the lac gets deeper and deeper, and the varnish shortly becomes a brilliant black; a very thin coat of this is laid on with a flat hair-brush. The article is left in a steamy heat, and at length comes into the hands of a workman, who rubs it down in water with very fine pumice. The work then receives a second coat of the lac varnish, and after that a second polish, and these two operations are successively continued till the surface is perfectly even and brilliant. This we may say is the secret of a brilliant finish. The work, whatever it may be, is coated with the varnish, until a body of sufficient thickness is obtained to enable the work to be ground to a perfectly smooth surface with pumice-stone. One of the advantages of tin as a material for japanning is that the surface is polished to begin with; hence the polishing is not necessary, the final coats flowing on smoothly, because of the smooth surface underneath. As the operations described advance, a still finer quality of lac is used; there are never less than three coats laid on, nor more than eighteen. The decoration of the object is confined to an artist workman, who first draws in the design with white lead. If he is satisfied with the sketch, he engraves it, and fills in the thousand little details of the subject. There then remains only to paint with the camphorated lac of Kouang-si, which serves as a mordant on which to gold either with leaf gold or powder. The reliefs are obtained with one or two coats of hoo-kintsi, which is a thick pink-like substance, resembling the "raising" preparation used by artists for making lines and figures stand up above the general level of the work.

These gilt designs are then enriched with the lac of Fo-kienn. Little is known of the fine lacs of Sou-tchou and Nann-king; the price is very high. This is explained by the cost of the work, which requires the application, the hardening and the polishing, alternately, of eighteen or twenty coats. In their lacquered objects the purity and brightness of the varnish, the infinite minuteness of the decoration and the finished workmanship of the furniture are most admirable. In the work from Japan, pieces of mother-of-pearl, cut to form, are inlaid in the lacquered grounds, and the last coats of the varnish are polished with a reed.

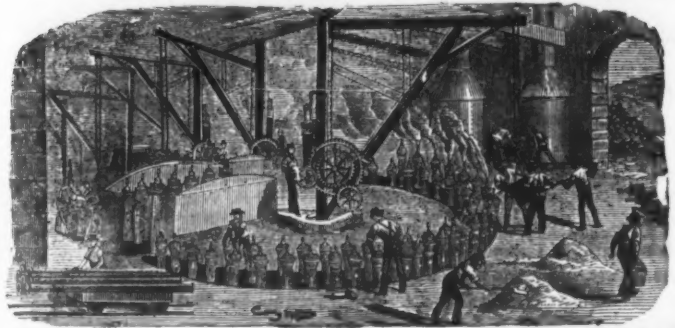
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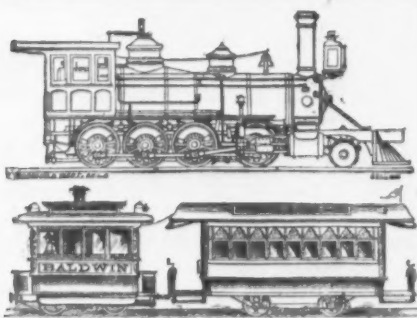
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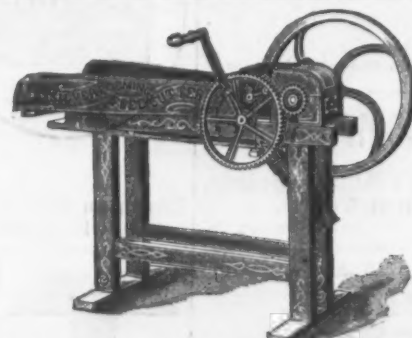
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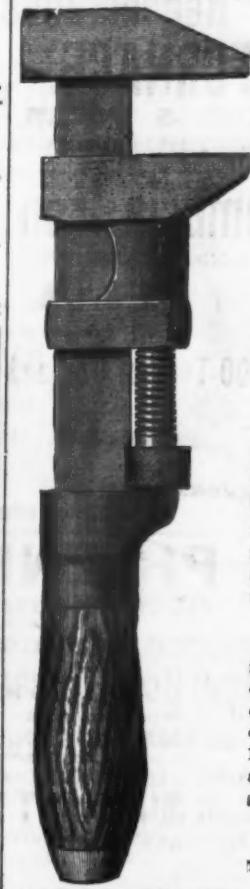


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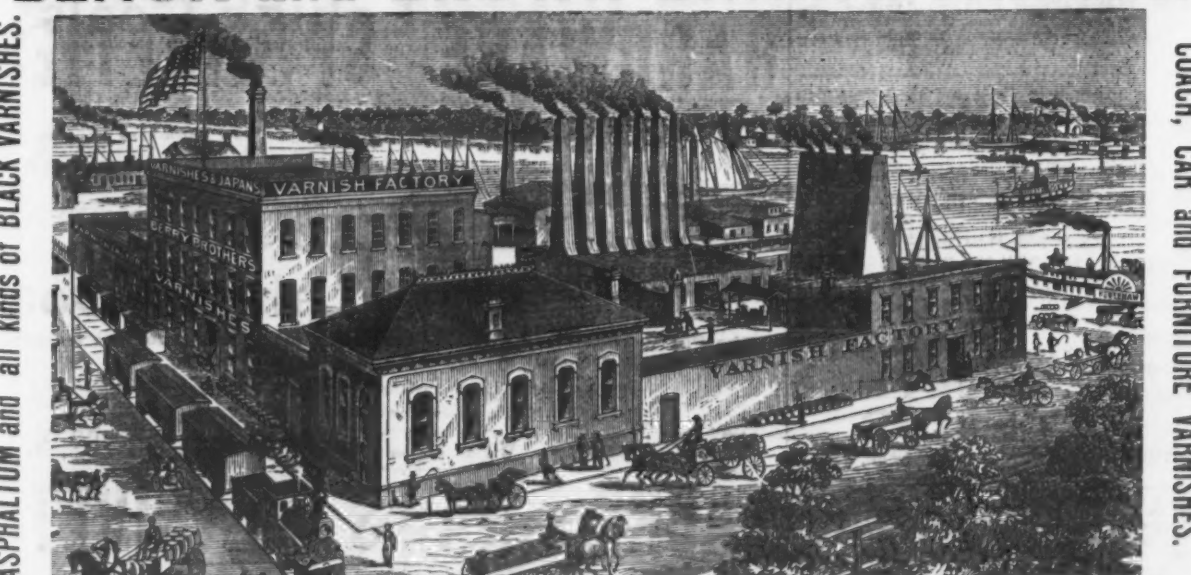
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Lightning Protection.

The London Building World has the fol-
lowing on the subject of protecting buildings
from lightning. It contains much valuable
information and some hints upon the method
of making ground connections which will
in most cases protect buildings or
chimney stacks to protect:

A case of injury to a church by lightning
has lately been reported in the papers, which
very conveniently illustrates our remark
that one conductor applied to the tower is of
no avail to protect the whole building. A
church near Shrewsbury was lately struck
by lightning during divine service, and the
narrative informs us that, "strangely
enough," the high square tower and its con-
ductor were quite undamaged, but that the
lightning came through the roof of the
choir, passing down by the organ pipes, and
seriously injured five members of the con-
gregation who were in the chancel, and who
were "badly burnt and had their feet cut
by the electric fluid." The roof of the chan-
cel was much injured.

Now, let us inquire into the cause of this
not uncommon kind of occurrence, and see
why the conductor on the tower could not
defend the chancel, and what ought to have
been done by the architect who erected the
conductor so as to provide against such a
casualty.

We must begin by reminding our readers
that elevated points on the earth's surface
exert no attractive power on the lightning.
The attractive forces tending to bring to-
gether the positive and negative electricities,
as we described in our first paper, are
exerted between two extensive planes,
namely, those of the cloud and of the earth
under it, and, consequently, the exact line in
which the flash takes place will depend upon
a variety of circumstances; so that, al-
though the highest point of a building may
form a passage for the shock, it is not the
only one, and is by no means the cause of
the discharge, which would take place,
sooner or later, between the ground and the
cloud, even if the building were absent. We
may say that there are three causes in gen-
eral, not to mention other local and particu-
lar circumstances, which will often induce
the lightning to strike a less elevated, in
preference to a more elevated, portion of a
building. First of all, there is what we call
the "bellying" of the cloud, or protuber-
ance of its lower surface, whereby it may
happen that this portion may be in reality
nearer to some low part of a building than
any other part of the cloud is to the more
elevated tower, and, consequently, the flash
will occur between the cloud and the low
structure. Then again, in the second place,
we must remember that thunder clouds are
often driven past by the wind, and that
ragged portions of cloud are thus drifted
along frequently at a very small elevation
above the earth, so that flashes will strike
out in this way horizontally against the
sides of the building. And, in the third
place, bifurcation, and even trifurcation, will
sometimes occur, by which means, while
one portion of the flash will strike the higher
parts, another portion will dart off to a lower
section of the building.

There is, therefore, no difficulty in un-
derstanding how the chancel of a church may
be struck by lightning, even when the tower
is efficiently protected itself by a good con-
ductor. For the fact is, that what is called
the "radius of protection" of a conductor
is by no means extensive. Arago and De la
Rive agree in considering that a conductor
can only defend from injury a circular
space around it whose radius is twice its
height, measured from the point of the build-
ing from which it rises. And even this rule
is far from being absolute, for it will vary
with the form of the rod, as well as with
the nature of the building, to say nothing
of the differing circumstances of each
storm.

What is, then, our remedy? How are we
to protect a building so as to render it se-
cure in every part? This question has been
admirably worked out by Prof. Clerk Max-
well, who begins by proving that a space is
absolutely defended from lightning which is
covered in with a conducting substance; so
that, for instance, a man in complete armor
is perfectly secure in a thunder storm, and
so is a powder magazine if the building is
wholly sheathed with sheet copper. No
matter if the building contain metallic
structures, such as engines, &c., provided
they are entirely within it. But if any
conductor, such as a telegraph wire, or a
water pipe, enters such a building from
without, the "potential," or electrical con-
dition of this conductor may be different
from that of the building, and it must, there-
fore, be connected with the conducting shell.

In practice, of course, it would be quite im-
possible thus to cover the entire surface of a
large structure, such as a church, with
copper. So Prof. Clerk Maxwell goes on
next to prove that this is by no means neces-
sary in order to prevent any sensible effect
if it were struck by lightning. It is quite
sufficient to inclose the building with a net
work of conductors. And this may be con-
veniently effected practically in three ways:
First, by taking care, if the structure has
many salient points and angles, such as
turrets and pinnacles, that each and every
one of these is furnished with a good vertical
conductor, of such a height that its "area of
protection" may overlap those of other con-
ductors near it; secondly, by forming a
metallic skeleton of the building—or, in
other words, by laying copper rods along
every edge, horizontal and vertical, and
connecting these all with one another and
with the main conductors; or, thirdly, and
which is most to the purpose in ordinary
cases, by arranging so that all metallic
masses, such as lead roofs, water spouts,
iron girders, &c., shall have connection
with one another and with the various con-
ductors erected on the building. It is,
therefore, by no means a difficult matter for
an architect who understands his business to
render a church, say, secure by following
one or all of these methods, according to cir-
cumstances. Let him, for example, erect
several main conductors—one down the
chief tower, if it is a cruciform church,
and one down the east end of the chancel,
and third down the west end of the nave;

and let him connect with these all the
masses of metal outside the building, taking
care (in case there are not enough of them
to form a tolerably close network) to supply
their place by copper rods along the edges.
No ordinary thunder storm could then injure
the church. It is, in fact, due to an uncon-
scious observance of these rules that Ameri-
can houses are notoriously free from injury
by lightning, although storms are frequent
in the United States, for the houses are com-
monly covered with metal roofs, connected
by tin or copper gutters and shoots with the
ground. The only unprotected parts are the
chimneys, which are easily secured by short
lightning rods soldered into the roof.

Again, some special parts of a building
may happen not unfrequently to be so
formed or situated as to be peculiarly
liable to injury. Projecting cornices, for
example, may be better secured against
lateral strokes if they are defended by a hori-
zontal and projecting conductor, provided,
of course, that this is well connected with
other conducting rods. Nor is it altogether
useless to have one or two horizontal rods
proceeding thus from the main conductor
itself at right angles to its length and sev-
eral feet below its pointed summit.

Moreover, it will generally happen that
one face of a tall spire or chimney conducts
the lightning better than the other sides, and
this is found to be usually that which looks
to the southwest, because, as most of our
storms and rain come from that quarter,
such face is often damper at all times, and
is, at any rate, soonest wetted by the ap-
proaching storm. The effect of this was
well seen in the injuries suffered in 1836 by
the spire of St. Michael's Church, near
Cork, which had no conductor. The south-
west face was literally rent all down in a
straight line, the stones and cramps being
hurled out to some distance. The rain had
made this the line of least resistance, but
not of sufficient conductivity to carry off
the discharge without damage. So likewise
in the case of a tall chimney or flue, where
the hot air and ascending smoke form a
conducting pillar and the rain wets one side
more than others, place your conductor on
the southwest side of the structure in pre-
ference to the other sides.

Such being the general conclusions at
which modern science has arrived as to the
theory and application of lightning con-
ductors, let us, before quitting the subject,
notice briefly one or two points which may
be of interest to the practical reader.

There is no doubt, we think, that every
large house in the country, and not merely
extensive buildings, such as churches,
factories, &c., should be furnished with a
good system of lightning conductors, for all
edifices are at any time liable to be struck.
But we cannot too much insist upon the
fact that unless such conductors form a net-
work over the building in the way which
we have described, that they are compara-
tively valueless; while, unless they have
also a good connection with the ground, they
are even worse than useless—nay, highly
dangerous. We have heard of a gentleman,
lately retired from business, and who, hav-
ing built for himself a large suburban villa
residence, consented to his architect's ad-
vice to have his house conducted. This
was done, and to all appearance very ef-
fectually; for not only were conductors erected
on all the chimney stacks, but these were
fully connected with the water pipes, and
all of them joined to one main conductor,
descending vertically from the highest point
of the whole building. And yet, as it
turned out, this house was a most danger-
ous one to live in in a thunder-storm! The
gentleman was asked one day by a scienti-
fic friend where the main conductor en-
tered the earth, as no sign of it was visible
below a certain point. He did not know,
and, in fact, had never inquired; but on ex-
amination it was found that this chief con-
ductor, with which all the others were con-
nected, entered a cupboard in the drawing-
room and there stopped, hanging suspended
above the floor, near the fire-place, at a dis-
tance of a yard or so from the ground. So
that, as a matter of fact, and through the
ignorance or carelessness of the architect,
this gentleman had been actually sitting,
day after day, in his easy chair, close to
this unfinished conductor, and in exactly
the same kind of situation during thun-
dery weather as if a loaded gun were
pointed at him, ready to go off at the slight-
est action. So very important is the com-
munication of the conductor with the earth.

We have already adverted to the action
which is exerted by pointed conductors in
silently tapping the thunder cloud and de-
priving it of a portion of its electricity,
whereby the number and violence of the
strokes is materially diminished. Our read-
ers are also doubtless aware that the forma-
tion of hail is intimately connected with the
presence of a large quantity of free elec-
tricity in the atmosphere. If then, as Arago
has shown, we were able, by the erection of
pointed conductors on buildings all over the
country, combined with the similar influ-
ence exerted by tall trees and forests, to
withdraw a large portion of the electricity
thus silently from the clouds, the hail would
either not be formed at all, or would remain
in its rudimentary state, so that all that was
precipitated would be a harmless, extremely
minute hail or sleet. Can any one, he says,
doubt the great benefit which agriculture,
to say nothing of greenhouses and conserva-
tories, and such like glass structures, would
receive from the disappearance of hail
storms? All that would be necessary would
be that persons in all parts of the country,
instead of insuring crops and so forth against
hail in the usual insurance offices, should
combine together to spend their money
rather in erecting as many lightning con-
ductors as possible on their houses, barns
and ricks, and so mutually benefit each
other and the country at large. But until
such an experiment has been tried on a large
scale, we can hardly judge of the results;
and we must be content, therefore, merely
to suggest the subject and to leave it, on
Arago's authority, for consideration by all
who are interested in the matter, either as
a theoretical possibility or as a mere imprac-
ticable scheme, which may, perhaps, some
time or other, be more fully developed,
when, possibly, compulsory lightning con-
ductors may rank with compulsory drainage
and water supply.

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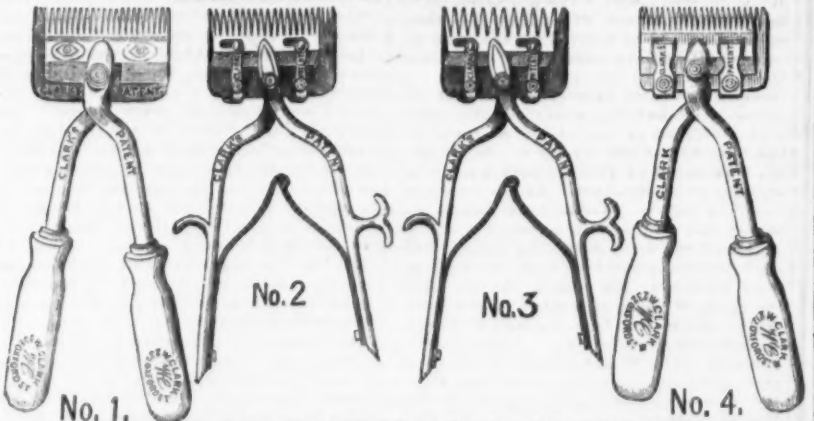
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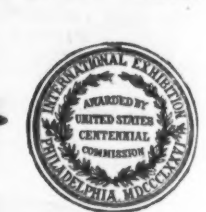
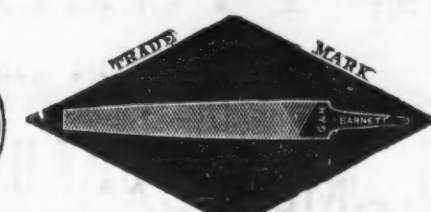
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Wire Nails, Moulding Nails, Escutcheon Pins, &c.

New York Salesroom, 116 Chambers Street.

AMERICAN TACK CO., Fairhaven, Mass.

A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

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MANUFACTURED BY
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ESTABLISHED 1836.

Trunk Locks, Door Springs,
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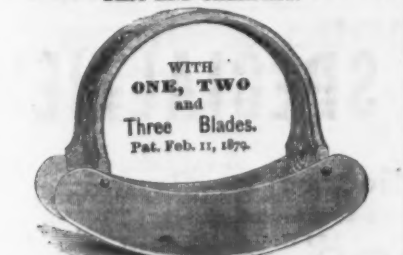


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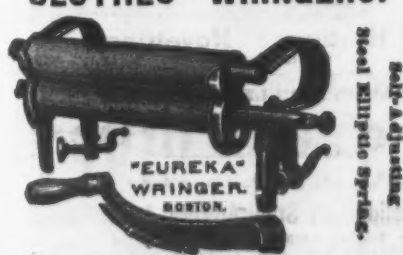
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AMERICAN MINING KNIFE,
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THE ANSONIA CORRUGATED STOVE PLATFORM, With Patented O. G. Border.



Cut Showing Round Platform.

THE ANSONIA STOVE REST.



This Cut is the Actual Size of 2-inch.

ROUND ZINC.

27, 30, 32, 34, 36 inch.

Manufactured of heavy metal, requiring
no nailing or lining, the edge retaining its
form. Superior pattern, finish and quality.
Price as low as any.

Send for List and Discount.

Packed 12 in each case.

STOVE RESTS are designed to
place under the feet of Stoves
and Ranges, for the purpose of
raising them from the floor or
platform. They are about 1/2-
inch thick, covered with sheet
metal in zinc, brass and nickel
plate. Highly polished and
finished. Packed one set of 4 pieces
in each paper box, and 36 sets in
each case. Sizes (inside of circle
on top)

2, 2 1/2, 2 3/4, 3 1/2 inch.

Send for full Description
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ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

NEW YORK BELTING AND PACKING COMPANY, The oldest and largest manufacturers in the United States of Vulcanized Rubber Fabrics

In Every Form, Adapted to Mechanical Purposes.



CABLE ANTISEPTIC COTTON ROPE. Patented July 8, 1872. This is a rubber-lined, extra heavy Cotton
Rope, woven seamless in a peculiar manner, to insure compactness and durability. The rope weighs
10 lbs to the section, and has been tested to 400 lbs. It is the lightest and most durable seamless Cotton
Rope in the market. For use on Hand or Steam Fire Engines.
ANTISEPTIC LINEN AND RUBBER-LINED LINEN ROPE. A cheap and durable article for mining,
mill and factory purposes. Will stand a pressure of 300 lbs. per square inch.

CAUTION.—Our name is stamped in full on all our best Standard Belting, Pack-
ing and Hose. Buy that only. The best is the cheapest.

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Price lists and further information may be obtained by mail or otherwise on application.

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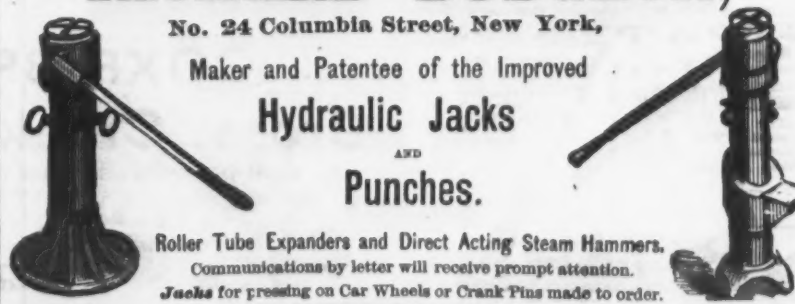
No. 24 Columbia Street, New York,

Maker and Patentee of the Improved

Hydraulic Jacks

AND

Punches.



EVERY
PUTNAM NAIL
is drawn down to a point from the red, thus:
It is the only Hot Forged and Hammer Pointed Horse Shoe Nail, made by ma-
chinery, in the World.

Some other manufacturers claim to make a hot forged Nail, but you will observe on all such a
sheared edge near the point.

P. O. Address, Neponset, Mass., U. S. A.

THE PUTNAM NAIL CO., Boston.

The Exhibition at Sydney.

SYDNEY, Oct. 9.—The exhibition was
opened on the 17th of September with as
much ceremony as circumstances would per-
mit. In the colonies of Australasia, which
are all little Republics, there are few titled
personages, and scarcely any person except
the members of the local force and volun-
teers privileged to wear uniforms or put on
any of the gorgeous finery which sometimes
sets the courts of Europe in a blaze. The
governors, who are usually members of the
Order of St. Michael and St. George, may
display a grand cross and a crimson and
blue sash over a suit of gold and
green; and the chief statesmen who
have been recognized in England as
men of Australasian fame, wear the col-
lar and the enameled star of Knights
Commanders. Sometimes, too, as Port Jack-
son is the central naval station of the South
Pacific, captain and lieutenants come among
us in the British, the French, the German,
and the American uniform. The judges of
the Supreme Court put on scarlet, and the
Bishops appear in university robes. The
great majority of people, however, clothe
themselves, even on special occasions, in the
sober costumes of plain citizens, who care
very little for fuss and ceremony, and have
a disposition to ridicule all attempts to
dazzle the eyes with finery.

A unanimous desire was expressed
throughout the colonies for the success of
the Sydney Exhibition. Though it is to
be followed next year by one in Melbourne,
the Victorians joined heartily with the
people of Sydney, and contributed their
best manufactures and raw product. For
some days before the opening the weather
was remarkably wet. Nearly two months' supply of rain fell in three days, and every-
body feared that the ceremony would have
to be postponed. Progress was retarded in
doors and out, and the courts were more or
less lumbered up with unpacked cases.
However, the commissioners resolved to
keep to the day they had first fixed upon.
So badly did things look, that the men-of-
war men—the British, the Austrians, the
Germans, and the French—as well as the
local volunteers, who were all to have taken
part in the street procession, were told the
night before that they would not be required
to turn out. But the 17th September proved
a lovely spring day. The sun shone out
brightly from a clear blue sky, the trees
were fresh and green, and a sweet smell arose
from the turf in the exhibition grounds.
The programme began with the street pro-
cession. In front marched the fire brigades,
with their polished and painted en-
gines, and their shining metal hats. Then
came Odd-fellows, Foresters and Druids, the
latter in long, white robes, with beards
down to their waists; the various trades—
carpenters, boot makers, iron founders, and
the like; and the Catholic and Protestant
benefit societies in green, blue and orange.
There was a little jealousy among them as
to who should walk first, but otherwise all
co-operated to render the procession a suc-
cess. As they marched down Macquarie
street, along the front of the exhibition, be-
tween two thick lines of spectators, the
sight awakened some of us to enthusiasm.
At Government House Gate, they halted for
the governor, who came forth, with his three
distinguished guests, in a splendid state
coach, brought all the way from St. Peters-
burg, with footmen in liveries of crimson
and gold—the only bit of pageantry we had
the fortune to see. His Excellency was
escorted by the mounted police, and accom-
panied by the British Commodore, the
Cabinet Ministers, and the Mayor of Syd-
ney, whose violet robe attracted no little
notice. As the party drove out, the
guard of honor, 100 strong, saluted, and the
public cheered loudly. The procession paced
the principal streets of Sydney for about
an hour, and then arrived at the main en-
trance. Here the governors of four colonies
were received by the commissioners. The
transept and nave were decorated with the
colors of all nations, which blended finely
with the tinted arches of the roof and the
hangings before the various courts. Under
the dome stood a statue of the Queen, draped
with the royal standard. As the procession,
now reduced in number to a select few,
passed the statue was unveiled amid the
cheers of the spectators. At the northern
end of the nave stood the dais, around which
were assembled the judges, the ministers,
the heads of churches, officers of the British
army, officers of four navies of Europe,
commissioners from all countries, from
America in the West to Japan in the East,
and the foreign consuls, among whom was
Mr. Spencer, the Consul-General for the
United States.

It was before the courts of America and
Great Britain that the ceremony was con-
ducted. The two countries occupied opposite
sides of the northern divisions of the hall
and the galleries—now filled with ladies—
which overhung it. Both gallery fronts
were decked out with flags. One method
of ornamentation adopted by the architect
was to display the names of the chief
cities along the gallery, surrounded by
the rose, the thistle, the shamrock, and the
beet-root-colored waratah of New South
Wales. Thus we read, as we glanced up at
the American court, the names of New
York, Boston and Philadelphia, which were
inclosed with the Stars and Stripes, rolled
up into ropes and suspended in festoons.
The capital city of Washington occupied the
central place, and the standards of the two
nations—America and England—were
grouped beside it in friendly union. It was
a happy thought to make the United States
and England the chief spectators. They
occupied nearly the whole of the nave front-
age, from the organ loft to the dome. At
the opposite end of the nave stood the courts
of France, Italy, Belgium, Switzerland, Aus-
tria and Holland on one side, and on the
other, the colonies of Victoria, Tasmania,
New South Wales and South Australia.
Germany had a frontage to the transept at
the main entrance, and Queensland and New
Zealand were also in the transept, while
Japan, Fiji and Ceylon were side by side
with the United States in the nave. The
programme did not take long to get through.
It was opened with a cantata—a song
of triumph over the rise and progress of
Australasia, whose foundation dates back to

1788, but which has now a population of
nearly 3,000,000, chiefly acquired since gold
discoveries were made in 1851. The busy
history of the colonies hardly dates back 30
years, and in that time have risen nearly
all the important cities. Sydney itself is an
ancient settlement, modeled, with its crooked
streets, on the plan of an old-fashioned Eng-
lish town before the era of railways and tram-
ways. Government House resembles a mediae-
val country seat; but all the recently-built
edifices—the public offices, Town Hall,
banks, &c.—are of modern type, and have
claims to be regarded as architecturally im-
portant. The picturesque surroundings of
Sydney are the theme of every visitor's ad-
miration. "Orta recens quam para nites"
is the exhibition motto; and when one con-
siders for what purpose the colonies were
originally founded 90 years ago, the praise
does not seem too lavish. The cantata was
performed by a choir 600 strong, strength-
ened by an orchestra of 70 performers. Then
came an address from the commissioners to
the governor, who replied with business-
like brevity, and declared the exhibition
open. Then all rose—the ladies thronging
the galleries, the distinguished personages
in the nave below, and the general body of
spectators—and gave three cheers. At the
same moment flags were hoisted on the
numerous masts on the towers outside, and
the ships of war began a loud congratulatory
salute, making the building tremble,
and announcing to the whole of the little
world around that the ceremony had been
satisfactorily performed. After the "Hal-
lelujah Chorus" and the Australian anthem
had been sung, the four governors made a
circuit of the main building, visiting all the
courts, and being introduced to the various
commissioners. In the evening a state din-
ner was given at Government House, and
the United States Consul was one of the
guests. It was announced that the Prince
of Wales would probably visit Sydney be-
fore the exhibition closed.

In accordance with several illustrious pre-
cedents, the main building was far from be-
ing ready on opening day, and one of the
courts most in arrears was the American,
where there were many blank spaces reserved
for goods not yet arrived. But hindmost of all
were the Germans and Austrians, who could
scarcely show anything except unpacked
boxes, though they had been in possession of
their space, along with the French, for a
longer time than any others. Great Britain
and the principal colonies were all well ad-
vanced, and had much to display. For 10
days after the opening the noise of hammer-
ing was constantly heard in the building,
but in the end a pretty complete state of
things was arrived at, and the public who
were rather inclined to hold aloof at first,
soon began to pour in in large numbers.
America had a fine show, on the ground
floor, of cutlery, saws and tools; of sil-
verware, electroplated goods; of cotton goods;
of sewing machines, organs and merino
wool from Vermont; of locks and keys;
house-furnishing materials; and on the base-
ment floor a fine display of Fairbanks scales,
as well as of stoves and kitchen ranges. The
work of two bridge-making companies, one
of whom has obtained a contract under the
New South Wales government (the Edge-
moor, of Wilmington, Del.), were repre-
sented by photographs and models. The
engraving and repoussé work in the electro-
plate sections were deservedly ad-
mired, as not surpassed either by the ex-
hibits of the great French house of Chris-
toble or the English manufacturers; but one
of the gems of the entire collection was the
silver case, in the nave, of the Gorham Silver
Company, of Providence, R. I., which con-
tained almost the only sterling silverware in
the entire exhibition. In the same area was
the big display of the Waltham Watch Fac-
tory, of Massachusetts, which made a consid-
erable hit, with its simple movements and
finely executed workmanship. The prin-
cipal electroplate exhibitors were Reed &
Barton, Simson, Hall, Miller & Co., and the
Meriden Britannia Company, all of New
York; keys and locks were shown by the
Yale Co., and Russell & Erwin; scales by
Fairbanks, of St. Johnsbury, Vt., and Howe
pianos by Steinway; stoves by Abendroth
Brothers; steel cutlery by the Stanley Rule
Company. School furniture was also shown,
billiard tables, ropes, clocks, paper boats,
&c. Both Machinery Hall and Agricultural
Hall had a strong representation of Ameri-
can inventions, but all in too backward a
state of preparation to be examined, even as
late as the present day.

High as is the quality of many of the Ameri-
can exhibits, it cannot be said that the inven-
tion and resources of the people are all com-
pletely illustrated. In fact, many visitors
from the States are disappointed at the
smallness of the total effect produced, par-
ticularly when they know that there is
scarcely a department of industry in which
Americans do not shine. Belgium has been
allowed to carry off the palm for iron cast-
ings from the Cockerill Factory at Seraing;
England shows all the best carpets, woollens,
cottons and wall papers, and in porcelain and
glassware is far ahead of all competitors. The
designs in *pâte sur pâte* ware and in glass are
stated to be equal to those shown at Paris;
indeed, the collections are the same. Ger-
many is strong in pianos; Austria, in Ro-
hemian glass; Italy, in marbles and mosaics;
Holland in gins and liqueurs. In cutlery
and saws the United States is entitled to be
considered first. Though the exhibition in
all respects has come up to the expectations
of the colonists, there is no doubt that they
would have been better pleased if their
brethren in the United States had shown
out a little more brightly. New South Wales
being a free trade country, ought to offer a
large market for American enterprise. Al-
ready some progress has been made toward
commercial intercourse. Pennsylvania loco-
motives are now running on several of the
main lines of railways; the reaper and
binder is in favor with many agriculturists,
while the carriage makers of Sydney depend
largely on New York for the ash and hick-
ory used in vehicle building. American
buckets, field implements, stoves, and sewing
machines are well known.

The colonies, in filling up their courts
have relied chiefly on the raw material with
which nature has endowed them, and which
art and enterprise have brought into the
market. Coal, copper, gold, silver and tin

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave patent
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
Hows.
Agents for the BENGAL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
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MERIDEN CUTLERY COMPANY.

The "PATENT IVORY" HANDLE TABLE KNIFE.

The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE
for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE,
BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application.
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CHAMBERS ST.
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AMERICAN TABLE
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EXTRA HEAVILY PLATED

Spoons, Forks, Knives, Etc.



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trial vs. C. Parker.
Send for list of other patterns.

WM. ROGERS, Wallingford, Conn.

Formerly of Hartford and West Meriden.

With SIMPSON, HALL, MILLER & CO.



AARON BURKINSHAW,

Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass.

Established 1853.

My Blades are forged by hand from the best Cast Steel, and warranted. To me was awarded the Gold
Medal of the Conn. State Agricultural Society.

HENRY SEYMOUR CUTLERY CO.
Manufacturers of Full Nickel Plated and Maroon Japan Handle
SHEARS AND SCISSORS.

Every pair warranted. Sold by Hardware Dealers throughout the country.
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Improved
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Tools.

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NICHOLS' SELF-ACTING ACID PUMP.

Absolute Safety!
Perfect Ease!

Time, Labor and Ma-
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NICHOLS ACID PUMPS,
to draw all kinds of acids from
carboys. Every pump war-
ranted. Send for new circular
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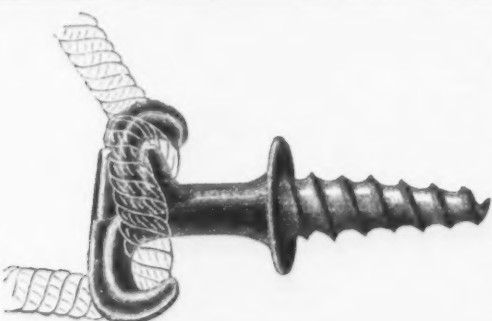
Acid Pump & Siphon Co
New London,
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The Old Way.

The New.

PATENT APPLIED FOR.

Champion Clothes
Line Hook.

This Hook has many points of ad-
vantage over anything offered, being
easily put up, holding the line firm;
and a line can be put up and taken
down without tying or untying, and is
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These shears are unsurpassed for cheapness, dura-
bility and utility. They are made of one solid piece
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use either in the bow or at the junction of the shank
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The demand for Joseph Rodgers & Sons'

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To distinguish Articles of Joseph Rodgers

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CANASTOTA KNIFE CO.'S POCKET KNIVES.

Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for im-
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The best

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Every

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McCOY & CO.,

IMPORTERS OF

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A large stock of

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Table Knives, Razors, Shovels, &c., &c.,

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Granted 1749.

Young's Patent Folding Scissors.

Having largely increased our facilities for the manu-
facture of these very popular goods, we offer them to
the trade at a large reduction from our former
prices. The list price of the large size is now \$12.00
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of Young's Patent Folding Scissors is the
very best. All are nickel-plated and furnished with
a neat morocco case.

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A. G. COES
PAT. DEC. 26, 1874.

Established in 1839.

A. G. COES & CO.

WORCESTER,

MASS.,

Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES

Screw

Wrenches.

PATENTED,

May 3, 1871.

December 26, 1871.

December 28, 1875

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The backstrain when the wrench is used is borne
by the bar—not by the handle.
The strongest Wrench made, and the only suc-
cessful Re-enforced Bar.
None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St.,
New York, carry a full line of our goods, and will be
pleased to serve you at factory prices.

GLASS BALL CASTERS

For Furniture, Pianos, &c.

The Best and Most Ornamental
Caster in the Market.

Do not cut, soil or rust carpets or matting.
Center bearing, they do not split furniture. War-
ranted not to break. They improve the tone of
pianos 25 per cent., and are recommended by
physicians as a preventive of rheumatism, sleep-
lessness, &c. By insulating bedsteads they pre-
vent loss of electricity from the body, and pro-
tect from lightning.
For sale by the Hardware trade generally.
For circulars and price lists address,

The Glass Ball Caster Co.,

96 JOHN STREET, NEW YORK.

CLARK'S

RUBBER WHEELS.

Adapted to all purposes, viz.,

Warehouse Trucks,

Platform Trucks,

Scales,

Boxes,

Baskets and

Heavy Casters.

For full particulars see the

first issue of The Iron Age

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GEO. P. CLARK,

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Plymouth,

WM. ROGERS & SON, AA,

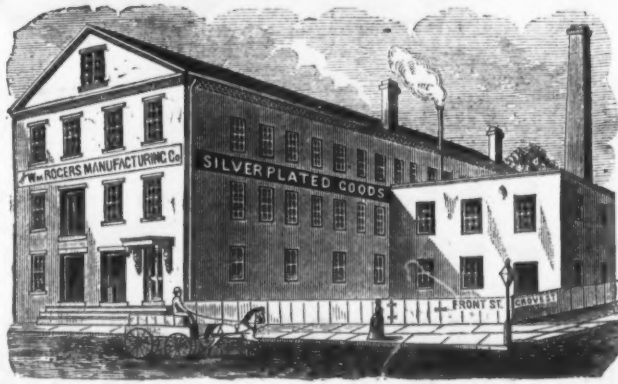
HARTFORD, CONN.

Trade Mark
ON SPOONS:

Wm. Rogers & Son, A. A.
Established in 1865.

We call especial attention to our new pattern, the "HARTFORD," which is beyond question the latest and noblest pattern in market.

WM. H. WATROUS, President.



Trade Mark
ON KNIVES:



Established in 1865.

SUPERIOR SILVER-PLATED
KNIVES,
FORKS,
SPOONS,
CASTERS,
CAKE BASKETS, &c.

F. WILLSON ROGERS, Secretary.

HARTFORD.
Pat'd Sept. 23, 1879.



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Electro Plated Ware, German Silver and Britannia Spoons.



THE "EASTLAKE." (Patented.)

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.



FORKS, SPOONS, Etc.,

Manufactured from Cast Steel, Plated with Nickel and Silver.

WALLACE BROTHERS, Wallingford, Conn.

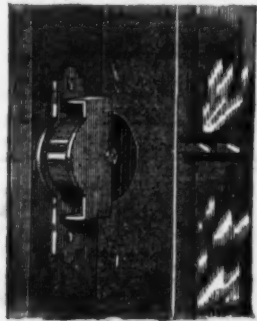
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ANTI-WINDOW

RATTLER,

FOR

Dwellings, Cars, Steamboats, &c.



The Anti-Window Rattler supplies a long needed want; it is so simple in construction that it can be used on any window, and so complete that it will prevent the slightest shaking, no matter how great the jar or how old the sash. As shown in cut, it consists of a rubber wheel in a nickel-plated or brass frame; is ornamental as well as useful, and does not interfere with raising or lowering the sash.

HEATON & DENCKLA,
General Agents,
507 Commerce St., Philadelphia.

GRAHAM & HAINES,
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113 Chambers St., New York.

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26 to 38 Pearl St., Boston, Mass.

SCALES.

Cuts of a few goods made by

JOHN CHATILLON & SONS, NEW YORK, U.S.A.

WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

The rapid increase in the use of Nickel-Plating owing to the introduction of the Weston Machine and the very low price of nickel material, enables us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or metal surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., \$250.

We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, & S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS. We call attention to infringements of the Weston machine, in which Automatic Switches are used to pre-empt change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

CONDIT. HANSON & VAN WINKLE
Sole Agents, NEWARK, N.J., U.S.A.

ENGLISH AGENCY: 18 Caroline Street, Birmingham.

ALWAYS ASK FOR

ESTERBROOK'S



Steel Pens.

THE MOST POPULAR PENS IN USE.

For Sale by all Stationers.

ESTERBROOK STEEL PEN CO.,

Works, Camden, N. J. New York.

Patent Concave Ox Shoes.

The only forged Ox Shoe made with concavity to fit hoof, and the best and cheapest.

GREENFIELD TOOL CO.,

Greenfield, Mass.

R. COOK & SONS,

Manufacturers of

Carriage & Wagon AXLES.

WINSTED, CONN.

ESTABLISHED 1839.

AXLES

All kinds Wagon & Carriage Axles

Manufactured by the

LAMBERTVILLE IRON WORKS,

LAMBERTVILLE, N. J. Send for prices.

are to be found in several sections; timber and cabinet woods, sugar, and even coffee and tea, from tropical and sub-tropical regions; merinoes and long wools, and wines in extraordinary variety, showing that the grape is now being assiduously cultivated from the 30th to the 36th parallel of south latitude. In manufactures of the simpler kinds, New South Wales and Victoria are already manifesting progress. The colonial makers of agricultural implements and machinery, like plows, harrows, mowers, winnowers and threshers, almost occupy the field, to the exclusion of imported articles. The Sydney and Melbourne factories are getting on well in the manufacture of heavy and light tweeds, furniture-making, rope-making, and they annually turn out large quantities of boots, shoes, saddles; they are commencing to make portmanteaus and trunks, and already show some skill in brushware. The iron foundries are not well represented at the exhibition, though both iron and coal are cheap and within easy reach. In iron and steel the leading exhibitors are from Sheffield and South Staffordshire and from Belgium. At the Melbourne exhibition, to be held in October, 1880, the United States may make a more complete show than they have done here; but some of the present exhibitors are doubtful whether it will pay them to go there, because Victoria has followed the example of the United States by establishing a system of protection, and is endeavoring with the aid of duties, amounting to 25 per cent. and even more, to exclude "foreign" competitors. Nearly all the other colonies profess free trade, and if they have ad valorem duties, it is only for the purpose of raising a revenue.

The commissioners for the United States are Mr. Spencer, the Consul-General; Mr. S. P. Lord, of Melbourne, Vice-Consul; Mr. Augustus Morris, of Sydney, and Dr. Williams, of the Baldwin Locomotive Works, by whom, in conjunction with Mr. Cox, the secretary, the bulk of the work has been done. It was not until very late that any commissioners were appointed. The court was marked out by Dr. Williams, at the request of the American exhibitors, before he was actually appointed by the Washington authorities, and had it not been for his energy and tact, it is certain there would have been a considerable muddle.

Wire Straightening and Cutting Machinery.

In response to inquiries for a more detailed description of Mr. John Adt's wire straightening and cutting machinery, illustrated in the last issue of *The Iron Age*, we append the following:

The operation of the machines for shorter lengths is as follows: The wire enters from the left, through the rotary straightener shown, and as it emerges passes between a pair of adjustable feed rolls (the pressure on which is regulated by the hand wheel seen at the top), and is carried through the bushing die seen in the short machine, and against the gauge or stop shown on the cut-off lever. This lever turns on a fulcrum pin in the middle, and its lower end connects with a cam on the shaft that carries the balance wheel and driving pulley. As this shaft revolves, the cam throws the lever forward, and it cuts the wire off instantly. The small pulley shown above the cam shaft drives the feed rolls. The balance wheel, having a turned face, may be used as a driving wheel instead of the pulley, whereby a different length may be cut. This machine can be adjusted to cut lengths of from about 8 inches down to that of the shortest rivets, varying by the smallest fractions of an inch as desired, and the pieces are cut very rapidly.

In the machine for cutting greater lengths, the fulcrum pin of the cut-off lever is fastened to it, and runs out in the form of a small shaft to about the length that the machine is intended to cut. The guide bar seen above it is connected with the cut-off lever, and has a groove of about the size of the wire to be cut running its entire length. A movable, adjustable gauge at its outer end is connected by a wire with a clutch on the cam shaft, and as soon as the wire passing through the straightener, feed rolls and bushing die into the groove, strikes this gauge, it is pushed out a little, pulling the wire and throwing in the clutch. The motion of the revolving balance wheel is thereby communicated to the cam shaft, and the cut-off lever is made to work. The simultaneous motion of the long shaft or fulcrum pin, by means of the small levers and springs shown above the guide bar, throws a cover off the groove, and allows the wire that is cut off to drop into the forked receptacles seen below. If the last piece of any coil of wire should not be long enough to strike the gauge, it will remain in the guide bar, in which case the handle seen above the bar may be depressed by hand, which will throw off the cover and allow the piece to drop out.

A Prospective Quarrel Over a Rolling Mill.

The sale of the old McKnight mill, noticed in our column of Industrial Items, promises to give rise to trouble that may end in a lawsuit. Less than a year ago the creditors of the bankrupt firm offered the mill for sale for the sum of \$40,000, on long payments. Under the auctioneer's hammer it brought \$72,725. Messrs. Lewis, Oliver & Phillips, of the Monongahela Iron Works, have a long lease of the mill property, notwithstanding the announcement that they had rented it for only a short term, and there promises to be litigation over the possession of the property. Messrs. Lewis, Oliver & Phillips will undoubtedly hold the creditors strictly to the terms of the lease, as they went to a great deal of trouble and expense in putting the mill in operation. The purchasers claim that they can take possession immediately, but to this proposition Messrs. Lewis, Oliver & Phillips emphatically demur, and a pretty legal fight for the property is in prospect. The terms of the sale are half cash and the balance in six and twelve months. Not another iron merchant of Pittsburgh put in a bid, and it is said that Lewis, Oliver & Phillips cer-

tainly would not have offered \$70,000 but for the advantage of being in possession, with the mill in good running order. It is an old-time iron mill, and when it was burned down eight or nine years ago no change was made in the furnaces. The buildings are good.

The first step in the legal fight was taken immediately before the sale commenced by Messrs. Lewis, Oliver & Phillips, through Mr. Henry W. Oliver, Jr., who served the following notice on the assignee, creditors and purchasers:

"I, Henry W. Oliver, Jr., a member of the firm of Lewis, Oliver & Phillips, hereby give notice to all whom it may concern, that about the 1st of May, 1878, they leased the McKnight Rolling Mill for a term of 15 months, said lease to expire on the 1st day of August, 1879. That full possession of said mill was, without reservation, given in presence of witnesses by Mr. Edwin Miles, agent of the owners, to Lewis, Oliver & Phillips. That about the 1st day of May, 1879, desiring to make many much-needed improvements in the mill, which were absolutely necessary to keep it in running order, before making such improvements, they secured a renewal of the lease of the mill for another year, from the 1st day of August, 1879, to the 1st day of August, 1880. That the lease was ratified by the action of the majority of the owners of the property, who united in a letter to John W. Wylie and Edwin Miles, requesting them to lease the mill to Lewis, Oliver & Phillips.

"That the leasing of the mill was reported to the United States Bankrupt Court by Edwin Miles and John W. Wylie. That they have never received notice from any of the parties interested, requiring possession of the mill. That they now have possession, and are operating the mill, and it is their purpose to hold and remain in possession until the expiration of their lease, on the 1st day of August, 1880."

The New Cable Completed.

NORTH EASTHAM, MASS., Nov. 17, 1879.

The steamer Faraday returned at half-past seven a. m. Sunday and anchored a mile off the beach. M. George Von Chauvin, cable engineer, boarded the steamer, followed shortly after by President Bates and Vice-President Thomas Swinyard, who went on board to welcome Capt. Trott, of the Faraday, and Mr. L. Loeffler, the agent of Siemens Brothers. The work was immediately commenced on the shore end of the cable, and at six p. m. it was on the beach and laid through a trench dug to receive the same, and signals exchanged with the Faraday from a temporary building on the beach. The shore end being landed, the officials connected with the cable company and the American Union Telegraph Company, together with M. P. Magne, Inspector of French Telegraph lines, and Count Von Hoff, went on board the steamer and she proceeded to the spot where the cable was buoyed, some ten miles off shore. To-day the final splice was made and the cable was worked throughout the entire circuit, from Cape Cod to Brest, and America and Europe are now connected by another tie.

About 1000 people visited the beach yesterday from adjoining towns, quite a number of whom went on board the Faraday.

CONGRATULATIONS.

The first cablegram over the new French cable at Brest from this station was as follows:

NAUSET BEACON LIGHT, CAPE COD, {
NORTH EASTHAM, MASS., Nov. 17, 1879. }
To President of Compagnie Française du
Telegraph de Paris et New York: It gives
me unbounded pleasure to send to you,
through your own cable, this moment com-
pleted, the warmest congratulations of my
company upon an achievement in respect of
which, both as regards rapid construction
and the laying, as well as perfect insulation,
there is no parallel in cable history, it being
only just seven months from this very day,
the 17th of November, since the concession
to your company was granted by the French
government. Messrs. Siemens Brothers,
Mr. Loeffler, Capt. Trott and Mr. George
Von Chauvin, your worthy representatives
in this country, deserve the highest praise
for the energetic and able part each has
taken in this great enterprise, through the
success and instrumentality of which it is
devoutly hoped that national friendship and
commercial intercourse between our two
republics, as well as between the Old and
New Worlds generally, will be further
strengthened and advanced. D. H. BATES.
President American Union Telegraph Co.

The steamer Faraday came back from making the final splice at 3.30 p. m. The entire party soon after assembled on the beach, where mutual congratulations were exchanged. All the business having been finished, a final departure from the beach took place, and at a few minutes before 6 o'clock the party started from North Eastham station by special train for Boston. Previous to starting, Cable Director Brugiere and Engineer Von Chauvin wired their thanks, on behalf of the French Cable Company, to Secretary Evarts for the liberal action of the American government, by means of which the cable was landed under very favorable circumstances.

A description of the cable is as follows: The conductor is formed of one copper wire in the center of ten smaller copper wires. This is incased in three layers of gutta percha, outside of which are 17 iron wires, and the whole is incased in a covering of prepared hemp. Its insulation is perfect.

Ocean Tonnage at Montreal.—The ocean tonnage at this port during the past year has been the largest on record, amounting to 468,000 tons, an increase of 88,000 tons over last year, and 68,000 tons over 1874, which shows the next largest tonnage. The total increase in the revenue of the Harbor Board so far this year is \$35,000.

The Bangor Foundry and Machine Company, and Wood, Bishop & Co., of Bangor, Me., have increased the wages of a portion of their help 10 per cent.

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

J. W. LYNDE, Secretary.

PLATTSBURG, N. Y.

STERLING & CO., Agents, 7 and 9 Cliff Street, New York.

METALLIC AMMUNITION,

Rim and Central Fire, all Sizes.

GUN WADS, Black and Pink Edge,

Guaranteed Superior to any Imported.

THE UNION METALLIC CARTRIDGE COMPANY,

BRIDGEPORT, CONN.



PRICE LISTS WITH DISCOUNTS TO THE JOBBING TRADE ON APPLICATION.



PERCUSSION CAPS.

F. C. Trimmed Edge, W. Proof.
F. L. Ground Edge, W. Proof, Foil Lined, equal to any imported.
D. W. P. Ground Edge, W. Proof, Central Fire, equal to any imported.
Musket, Paper and Tin Boxes.
Berdan, Orcutt and Wesson Primers.
Bullet Breech Caps.

PAPER and BRASS SHOT SHELLS.

PAPER.

Celebrated "U. M. C." Sizes, 8, 10, 12, 14, 16, 20, Central Fire.

BRASS.

Berdan, Solid Anvil. Sturtevant, Movable Anvil. Buffington, Movable Anvil.
Berdan Primer.

Kenney's Patent Indentation to prevent Wads from starting.

Agents: **SCHUYLER, HARTLEY & GRAHAM, New York.**

THE HOWE SCALE CO., Improved Scales & Weighing Machines of every Variety.

OFFICES:

PRIEST, PAGE & CO., 325 Broadway, New York.
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BORDEN, SELLECK & CO., 97 Lake Street, Chicago.
J. FRED. DENNIS, 16 Holborn Viaduct, London.

Works at Rutland, Vt.

SCUTT'S
PATENT
Four Pointed Steel Barbed Cable Fence Wire,
Manufactured by **H. B. SCUTT & CO., Buffalo, N. Y.**
(See Monthly Iron Age.)

Sold by the hardware
trade.



"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power
Stuffers,
Lard Presses.
Warranted thoroughly made
and the Best in Use.
MURRAY IRON WORKS,
Burlington, Iowa.

VERMONT SNATH CO.,
Manufacturers of

Pat. Swing Socket Snaths
and also a large variety of other styles of Snaths
Springfield, Vermont.



THE HARTFORD MACHINE SCREW CO.,
Manufacturers of
Hexagon Head Cap Screws, Round Head Set and Cap
Screws, Square Head Set and Cap Screws, Machine
Bolts, Gun Screws, Agraffes, Studs,
And other articles turned from Steel, Iron or Brass by automatic machine.
HARTFORD, CONN.
Our facilities are unequalled—the largest establishment of the kind
in the country.



HUSSEY, BINNS & CO.,



PITTSBURGH.

SHOVELS,
SPADES and
SCOOPS.

NEW Boots and Shoes can be kept Straight AND OLD ONES STRAIGHTENED BY USING LYON'S PATENT METALLIC HEEL STIFFENER

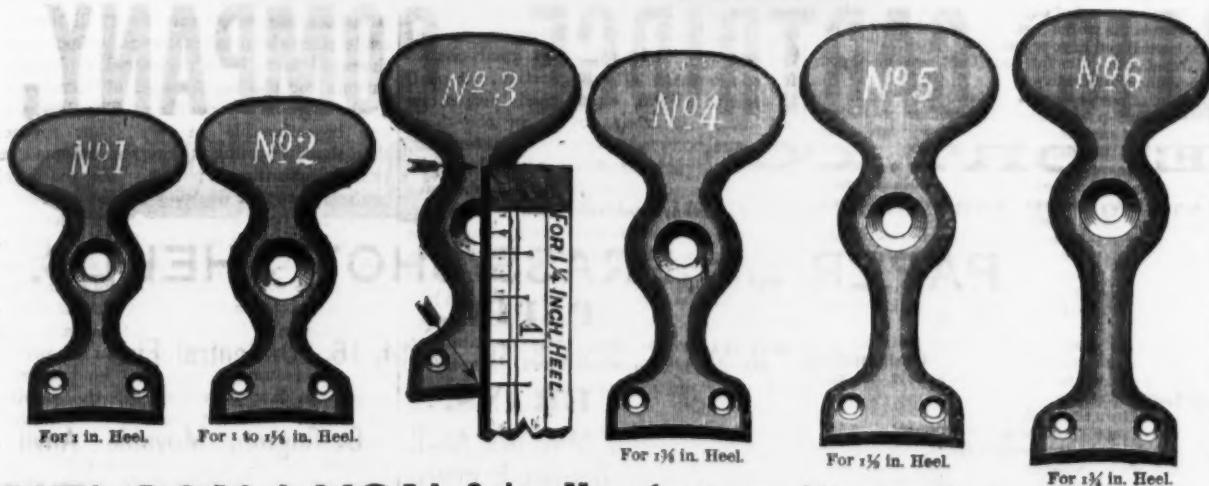
These can be applied to any Boot or Shoe at any time by any one.

Every Pair is Warranted to bend to fit the Boot without Breaking.

All Boxes must be marked, Manufactured only by NELSON LYON, Albany, N. Y., under Patents of July 9, 1872, May 18, 1875 July 11, 1876.

CATALOGUES SENT FREE.

For Sale by all Wholesale and Retail Hardware Dealers.



NELSON LYON, Sole Manufacturer, Albany, N. Y.

BLACK AND TINNED IRON RIVETS.

8 oz. 1 lb. 1 1/2 lb. 2 lb. 3 lb. 4 lb. 6 lb. 7 lb. 8 lb.

CURVE HEAD. TRUE HEAD. CONE HEAD. ROUND HEAD. COUNTERSUNK HEAD. MACHINE HEAD. TIRE BLANK. RARE RIVET. FLAT HEAD. COUNTERSUNK HEAD. MACHINE HEAD. TIRE BLANK.

W. P. TOWNSEND & CO.,
PITTSBURGH, PA.,
Manufacturers of every description of First Quality
RIVETS.

H. S. MANNING & CO.,
Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S

Manufacture of Patent Machine Riveted Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Riveted Pipe Taps and Pipe Runners, also of Solid Bolt and Pipe Dies. Furnished in V. U. S. Standard and Whitworth shape of threads.

111 Liberty Street, NEW YORK.

N. Y. Mallet and Handle Works

Manufacturers of
Calipers, Carpenters', Stone Cutters'
Tin, Copper and Roller Makers'
MALLETS,
Hawking Boetles, Hawking and Calking Irons;
also all kinds of Handles, Sledge, Chisel and Hammer Handles. Also
COTTON AND BALE HOOKS.
Patented Feb. 13, 1877; a new combination of Hooks.
456 E. Houston St., New York City.

MINING AND MINERAL ITEMS.

COAL.

A large quantity of coal is being shipped from Braidwood, Ill., but the mines are overcrowded with men, which makes the earnings of each man very small indeed.

The miners at Coshocton, Ohio, are now doing very well. The operators have plenty of orders, but experience difficulty in getting sufficient cars to transport their coal. The Home mines, in charge of Mr. Geo. W. Rickets, is again in successful operation after the long strike, with about forty miners at work, and wanting more. They posted a notice at the mine that on and after the first of November the price of mining would be advanced from 65 to 75 cents. The Beech Hollow mine of Cassingham & Prosser has been doing a good business all fall, with the usual number of men. They also give the advance from the first of the month. The Union Coal Company, under the supervision of Mr. L. W. Robinson, have completed, at a large expense, the side-track into their mine below town. They have now twenty men at work, but will soon increase this force.

The Saulsbury and Keystone Coal companies, near Myradsale, are paying their diggers 50 cents per ton.

It is reported that all the miners along the Baltimore and Ohio Road who have not been given the three-cent raise are out on strike for it.

It is reported that the only miners at work along the Monongahela and neighboring rivers are those in the railroad mines at Coal Bluff, who are getting three cents per bushel.

Some coal is being mined near Wadsworth, Ohio, within only five feet of the surface, and no rock or slate over it. This is said to be very unusual. The mines are working full time and have a good demand for all the coal they can get out.—Akron Beacon.

According to the calculation of the committee of the Schuylkill Coal Exchange, based upon the price of coal, the wages for October would be 24 per cent. below the \$2.50 basis, but by a participation in the advance of tolls the rate will be advanced to 12 per cent. below basis. For this month the rate will be 8 per cent. below basis.

The coal famine at points on the Lower Ohio has given a strong impetus to coal mining in districts that have heretofore supplied but little of the coal used in these markets.

It is said that there are over 150,000 bushels of coal, loaded in barges, on the Beattyville, Lee County, Ky., bar, awaiting a swell in the Kentucky River. When the river is up this coal is delivered at Winchester at less than 10 cents, while now that town pays from 25 cents to 40 cents per bushel.

The Duquesne Coal Mines (Mucklerat), Wilkins Township, Allegheny County, Pa., have passed into the hands of the New York and Cleveland Gas Coal Company, Pittsburgh. The company have made extensive improvements, and the mines will start up in a few days on a large scale.

On Tuesday, the 13th, Bear Ridge Colliery was sold to A. L. Mumper & Co. The purchasers will work the colliery until December 1, when the Philadelphia Coal and Iron Company will assume control of it.

IRON.

The improved condition of the iron industry has created a demand for iron ore. A number of new mines are being opened along the East Penn. Railroad.

A vein of iron ore has cropped out near Chambersburg, Pa., and there are rich discoveries near Allentown, where land has doubled in value within a few weeks.

The Lake Superior Mine at Ishpeming, Mich., has probably the deepest open pit whence iron ore is taken in the world. It is 175 feet, is entirely the work of man and no natural chasm. The walls are perfectly safe, the formation being free from dangerous cracks and seams.

The Emmet Mining Company, Waukegan, Mich., is rushing business of late, and have just added three new steam pumps and a magnificent portable engine.

The Champion has accomplished this year a larger production, as represented by her lake shipments, than in any previous year since the mine was opened in 1868.

The New York mine has crept well up toward her old time annual production, having shipped, up to the 26th, some 53,000 tons, against a last year's total of only 21,903.

It now looks as if the total shipments from Escanaba the present season might reach, if indeed they do not exceed, 700,000 gross tons. In fact, we are inclined to believe those figures have already been attained, the product of the Menominee miners not having been fully reported, as we have good reason to believe.

Robert Nelson had shipped from his Cleveland Hematite mine, up to Wednesday, nearly 14,000 tons, and expects, with favorable weather, to get away several thousand tons more before the close of navigation.

Mr. Stevens has suspended mining operations at the Chicago (old Spurr & Calhoun) mine, but will make a thorough exploration of the tract during the winter.

Messrs Foley & Adams are reported to be meeting with most encouraging results in their mining operations on the 40-acre tract just south of the McComber. There is no longer room to doubt the fact that they have found a most extensive deposit of hematite of the very best quality.

Among the idle mines on the Negaunee range are the Allen and Ada, from which were shipped in 1872 some 10,000 tons of ore. It is believed that these properties are equally as valuable as the Green Bay, which is within a stone's throw of one the Allen openings, and in which Hon. E. Breitung is now developing what appears to be an extensive deposit of first class hematite. We learn that there is a strong probability that the two properties will soon be leased to parties who will develop whatever of value there is in them.

The advance in freights and scarcity of vessels has had the effect of closing some of the smaller mines earlier in the season than would otherwise have been the case. The Manganese mine, after shipping nearly 10,000 tons, has suspended active mining

operations until next spring, though considerable work will be done in the way of sinking shafts and exploring new ground during the winter. The season's work has demonstrated the great value of the Manganese as a mining property.

The Thomas Iron Company seem to be operating largely in other places as well as in Morris County, New Jersey. They are at present mining ore in the mountains near Warwick, N. Y., where their operations are so extended that they expect at that point to raise from 30,000 to 40,000 tons this year. Other operators in that section expect to raise as many tons in addition to this, and a railroad company has been organized to build a narrow-gauge road nine miles in length to bring this ore out of the mountains.

Considerable quantities of iron ore and the finest quality of fire-brick clay are said to have been found near Allentown, Pa.

In Dr. H. K. Hartzell's first month's working of the new ore mine on Eli Lichtenwallner's farm, west of Fogelsville, Pa., 1000 tons of first-class ore were produced.

The Reading Times and Dispatch prints the following concerning the iron ore in Berks County: Recently 100 tons of ore from Landis' mine, near Bechtelsville, were taken to Fort Kennedy as a sample. Large orders are now received for ore from this mine—more than can be filled. Five hundred and seventy-nine tons of ore were shipped from Boyertown for the week ending November 8. Twenty-five men are employed in taking out ore at the California mines, Boyertown. The miners employed at the Gable Mine, same place, descend and ascend the shaft by means of ladders, each miner thus climbing 1600 feet every day.

The Charlottesville Iron Mine has been sold for \$50,000 to an English company, who are to begin work there at once.

The Jagger Iron Company, of Albany, N. Y., has purchased a farm at Cheshire, Mass., containing an ore bed, for \$5500, and operations upon it are to be commenced at once.

The Winthrop, Lake Superior, is asserting herself as one of the very best hematite mines in the district, her lake shipments, up to the 5th inst., footing up to 24,595 gross tons—a considerable increase over last year.

A slide of rock recently occurred in the Bessemer Mine, Lake Superior, which caused a suspension of operations, and the working force has been concentrated at another point.

The shipment of nearly 40,000 tons from the Saginaw Mine, Lake Superior, the present season does not seem to indicate that the mine is playing out nearly so fast as it was a few months ago supposed.

The Cleveland Mine shipments, Lake Superior, by lake, up to the 5th, were reported at 97,663 tons. The close of the season will show a falling off of from 25,000 to 30,000 tons in the product of this mine, as compared with last year—a result brought about by the total caving in of the roof of one of its most productive pits. The mine will, however, be in condition to renew her former production next year, should the state of the ore market warrant it.—Marquette Mining Journal.

PRECIOUS METALS.

Two mines were sold in Mineral Park Arizona, recently, for \$8000 and \$6000 cash. A number of Chicago mining companies are already operating in Mexico, and considerable Chicago capital is invested.

Articles of incorporation have been filed by the Sierra Gold and Silver Mining Company, of Nevada, incorporated in Chicago.

It is said that a very large number of the best gold and silver mines in Mexico are passing into the hands of United States capitalists.

It is stated that a mine in Nevada that made assessments to the amount of nearly \$500,000, has now paid \$42,120,000 in dividends.

In digging a well near Weathersford, Texas, recently, some metallic substances were found believed to be fair specimens of silver ore. They were taken 50 feet below the surface, and gave indications of a vein.

MISCELLANEOUS.

For more than 30 years capitalists have been prospecting in Pennsylvania and New Jersey for mines of zinc. In all this time only four have been discovered. One is at Bethlehem, Pa., owned by a Philadelphia company. The others are in the county of Sussex, N. J. The one at Franklin is owned by Moses Taylor, of New York; the second, at Ogdensburg, is the property of a New York company; the third is a newly-found mine that belongs to William A. Bryan, of Newark. This last is undeveloped, but those who have examined it pronounce it one of the most valuable zinc deposits in the country. The revenue from each of the developed mines is very large.

Large deposits of copper ore have been discovered at Phoenix, Maricopa County, Nevada, and the work of development will be commenced within a few weeks.

A Baltimore company have found a copper bonanza in the mines at Ore Knob, Ashe County, N. C., where 700 men are employed, and about \$300,000 is annually disbursed to the inhabitants for fuel, &c. A correspondent of the Baltimore American says that six additional furnaces are to be erected, and a railroad is being built to connect the mines with Greensboro. The monthly product of pure copper is 150,000 pounds.

On the 12th inst. the Central Pacific Railroad made a cash payment to the United States Treasury of \$220,520, which payment, with their credits for government transportation, is \$536,291.00, or 25 per cent. of the net earnings of the subsidized portions of the lines. This is the first cash payment made by any of the Pacific Railroad companies on their indebtedness to the government under any act of Congress. The cash payment from the Central Pacific Company for the year 1879 will not be due until February 1. It will be about \$600,000.

The merchants of St. Louis have organized a movement for the erection of a spacious and permanent exposition building like those of Chicago, Louisville and Cincinnati. It is intended to finish it for next fall.

The Iron Age

AND
Metallurgical Review.

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A curious feature in a large number of strikes for advances in wages that have been chronicled lately, is that they have been of the employees of workmen against the workmen. In various sections of the country, for example, the puddlers' and heaters' and rollers' helpers—who are not paid directly by the mill, but by the puddlers, heaters and rollers themselves—have been forced to strike for what they considered "their rights." The employees of the melters at steel works have done the same in a number of instances lately. It is amusing to see how little the labor papers have to say about these strikes. We do not recall a strike that has been undertaken by a puddler, or a heater, or a roller, that has not been heralded forth as a blow for freedom against crushing tyranny. There is a certain set of phrases that, for want of a better term, may be called "red-hot," which

are very useful to writers and speakers on labor subjects, but they do not seem to be used about the strikes of those who strike against workmen. Are not such conflicts as these between capital and labor to be recognized? The workman who employs another becomes at once one of the employer class, who, in ordinary language, are called capitalists. Are not the rights of these laborers against the grinding oppression of their grasping capitalists to be noticed? We commend this subject to the consideration of professional agitators.

The Quality of American and English Steel Rails.

Mr. James M. Swank, secretary of the American Iron and Steel Association, whose untiring efforts to promote the interests of American iron industries are everywhere recognized, has just published a pamphlet which is well calculated to put a stop to the unjust and unwarranted attacks made upon the manufacturers of steel rails in this country. In taking upon himself the burden of proof in a question which has been the subject of much newspaper controversy in this country and abroad, Mr. Swank has assumed a delicate and difficult task. It has been stated time and again by English newspapers and by a portion of the American daily press, that the only reason why English rails were purchased in this country was that some of our prominent railroad men had discovered that, owing to their superior quality, it was more economical, all things considered, to buy the foreign product at a higher price than to lay down the cheaper American rail. Although these assertions were not backed by anything more authoritative than the vague statements of interested parties, the fact that they could be met only by strong expressions of preference for American rails coming from experienced railroad men, and not by actual figures, was looked upon by many as a tacit admission of the relation between the rival rails. Mr. Swank, ignoring the absence of any proof in support of the assertions of those desiring to injure American interests, has sought to furnish a direct and final reply, by gathering figures showing the results of actual experience with American and English rails on American railroads. How largely he has been successful in this will be readily appreciated by a close study of the tables which we publish elsewhere. It is to be regretted that only one road besides that to which we referred in our issue of *The Iron Age* of June 26, 1879, has apparently kept a trustworthy record of the number of rails removed as defective from its tracks. Limited as the data are when compared to the enormous quantities of rails in use in this country, they are highly valuable, as they come from representative roads.

Referring to the figures given in the first table, Mr. Swank states that the exceptionally bad character of the rails made in 1871 was due to the fact that the scarcity of all kinds of pig iron in that year and the urgent needs of the railroads combined to prevent a careful selection of the pig by the Bessemer manufacturers. The same influences may be traced in the figures given in the second table. Mr. Swank then proceeds to consider the relation of the average life of foreign rails removed from the track to that of the American rails. The fact that this is favorable to the former is attributed by him to the circumstance that foreign rails laid down were subjected before shipment, for commercial reasons, to a stricter inspection than American rails, and partly also because English makers ten years ago had the great advantage of having ten years experience in manufacture, while Americans were beginning to feel their way. The tables show that while the quality of American rails steadily improved from year to year, there are indications of the reverse with the product of foreign works. Mr. Swank justly points out that the life of removed rails has little importance compared with the percentage rendered unfit for service from various causes. We believe, however, that by using the general averages given in his tables, he does not express the true relation between the two classes of rails. The experience of the Pennsylvania Railroad, as revealed by the figures given, furnishes strong evidence in favor of the high quality of American steel rails, even if no allowance is made for the serious damage done to their reputation by the exceptional circumstances of 1871. The percentage of rails removed, or, in other words, the number which after a given time become defective, is a true test of their quality. A glance at the tables will clearly show that with all rails, American as well as English, the number of removals during the first few years is very small; then there is a sudden increase, culminating rapidly, and diminishing again after one or two years. Those which have resisted destruction during this period may be looked upon as likely to be serviceable until diminished too much in weight by abrasive action to be safe. Now, the general averages deduced from the tables of wear of American rails include a considerable number of rails which have been in service only a short time. What the figures obtained from such rails are is readily discernible from Table 3, where both the average life of worn-out rails and the percentage of rails removed is very low. Where, therefore, recent years are introduced into the comparison, we will find both figures diminished. Averages drawn from tables which in one case include recently laid rails, and in the other

case do not, are not therefore fairly comparable. When the object is to contrast American and foreign rails they should be placed on equality, both in this respect and in regard to the time at which both were laid, so that the tonnage, &c., may be considered to be equal in both cases. In order to do this we have taken the group of four years, 1868-69-70-71, as giving the longest term of service of the American rails and fairly representing the foreign ones. We find, by calculation, the following figures:

	Ameri- can.	Penn- sylvan- ia.	For- eign.
Total laid, tons	24,593	19,650	8,413
" removed, tons	3,602.47	2,930.63	1,595.64
Average life of removed rails, years	5.50	5.80	7.50
Per cent. removed	14.64	10.33	18.61

These figures are a conclusive and final answer to all clamor in regard to the quality of American steel rails, which, it will be seen, have been of superior quality, even in times when American Bessemer practice had not yet acquired that precision and uniformity which have since characterized it.

Mr. Swank deserves great credit for having thus vindicated American steel rail makers; and while we differ from him somewhat in the numerical conclusions which he draws from the tables of results obtained by the Pennsylvania Railroad, we fully agree with him in his strong claims for the American rails. These claims, it is true, are somewhat modified as regards the figures by our version of the comparison, but they are fully justified by the facts.

The Census of 1880 and the Iron Trades.

The preparations for the census of 1880 are, no doubt, very elaborate, and we presume it is intended to cover as much ground and make the statistics collected as accurate as may be; but it is just possible that the matter will be overdone in these respects, and that manufacturers will be asked more questions than they are willing or have time to answer. From a copy sent us of the list of questions to be asked of ironmasters, and which is much too long for our columns, we think that those who contemplate answering them fully and honestly, would do well to have a history of their works and operations for the 12 months ended May 31st, 1880, prepared in advance. For example, the blast furnace men are asked the following list of questions:

Name of corporation, firm or individual operating the works.
Name of place, county and State where your works are located.
Whole amount of capital (real and personal) invested in the works you operate (whether owned or leased) and in your business.
What is the value of your buildings and of your machinery separately?
Kind of power—steam, water, wind or land.
If steam power, give the number of boilers, number of engines, total horse power and quantity of fuel used daily.
If water power, state on what river or stream, available head of water, kind of wheels and number, diameter and breadth of wheels, revolutions per minute, total horse power.
Number of persons employed—males of 16 years and upward, below 16 years; females of 15 years and upward, below 15 years.
Total amount paid in wages during the year.
Number of months in active operation during the year.
Number of completed blast-furnace stacks.
Total daily capacity, in tons, of melted metal.
Name the raw materials used—kind of ore, kind of fuel, kind of flux.
Tons of iron ore used, value.
Tons of fluxing material used, value.
Bushels of charcoal used, value.
Tons of anthracite coal used, value.
Tons of raw bituminous coal used, value.
Tons of coke used, value.
Give tons and value of all other materials used in the furnace.
Tons of cold-blast charcoal pig iron produced, value.
Tons of hot-blast charcoal pig iron produced, value.
Tons of anthracite pig iron produced, value.
Tons of bituminous coal and coke pig iron produced, value.
Tons of mixed anthracite and coke pig iron produced, value.
Tons of castings produced direct from the furnace and not included in the foregoing, value.
Value of all other work done, including jobbing and repairing.
Average number of hours of labor of your workmen per week.
Average wages per day of skilled workmen.
Average wages per day of unskilled workmen.
How many of your workmen live in their own houses?
How many of the workmen ordinarily employed by you are now unemployed through scarcity of work?
Please give an account of any strikes which may have occurred in your establishment during the past year, stating the question at issue, and duration and result of strike, with all facts pertinent thereto.

The questions for the rolling-mill men include most of the above, with others relating to materials and products which demand a detailed statement of the entire business operations of the mill for a year, including every detail. For example:

Tons of iron ore used, value.
Tons of pig iron used, value.
Tons of old iron rails used, value.
Tons of other old scrap iron used, value.
Tons of hammered pig or scrap blooms used, value.
Tons of purchased muck bar used, value.
Bushels of charcoal used, value.
Tons of anthracite coal used, value.
Tons of bituminous coal used, value.
Tons of coke used, value.
Tons and value of each other material used in manufacture.
Tons of bar iron produced, value.
Tons of rod iron produced, value.
Tons of angles, beams, channels and other structural iron produced, value.
Tons of skelp iron produced, value.
Tons of rolled iron car axles produced, value.
Tons of hammered iron car axles produced, value.

Tons of iron rails produced, value.
Tons of muck bar produced for sale, value.
Tons of sheet iron produced, value.
Tons of boiler-plate iron produced, value.
Tons of nail-plate iron produced, value.
Tons of all other plate iron produced, value.
Tons of hoop iron produced, value.
Tons and value of each other kind of rolled iron produced.
Tons and value of each other kind of hammered iron produced.
Tons of cut nails produced, value.
Tons and value of each other finished product made.
All other work done, including jobbing and repairing, value.

Similar questions, with such modifications and additions as may be necessary, are put to the makers of the several kinds of steel. If the information asked for is obtained, the statistics gathered will be the most valuable ever brought together—invaluable, indeed, to the future student of the nation's industrial progress. But we have no idea it will be obtained. Not one in ten of our ironmasters have the information called for in available shape. To pick it out of their various books would take time and interfere with the regular work of their clerks. For this reason many of those who are disposed to give the information, will be more likely to guess at the figures than to "speak by the card." There are many of another, and perhaps larger, class, who will consider the questions inquisitorial and object to answering them on general principles. Few manufacturers like to make so full an exhibit of their business as these questions demand; for while it is understood that the items will not be published, no one who makes out such a statement and signs it can be sure that it will not be seen by some one who has no right to see it. In the case of information of a statistical character regularly given to Mr. Swank for the Iron and Steel Association reports, or to Mr. Weeks for *The Iron Age* quarterly blast-furnace tables, they have all the guarantee which insure the sacredness of private correspondence with reputable gentlemen. The same would be true of private correspondence with General Walker; but we fear that many will object to making out such statements when it is likely they will pass through the hands of sundry clerks and irresponsible subordinates. Such suspicions are probably founded on nothing more substantial than a bare possibility of the information being used irregularly and in ways not authorized by General Walker; but many are naturally and habitually averse to giving such information to any one.

A third and larger class will answer most of the questions requiring exact answers by "a good guess and multiply by two." The habit of using "round numbers" for all figures, and "lumping" all quantities, is one that grows by indulgence, and as the census questions afford a good chance for any amount of exaggeration, we shall be surprised if some good people do not take advantage of it in the hope that somebody will see their statements, and with a vague idea that it is well to make as fair a showing as possible, to compensate for the omissions inevitable in census taking. But perhaps the greatest danger of all is that which will result from indifference on the part of the trade. A majority of our ironmasters will probably decide to give the information fully and correctly, but the work will be postponed with the intention of having it done when more convenient, and the "more convenient" season will never come.

We are heartily sorry that we cannot see a prospect of getting the information called for promptly and accurately from all classes of manufacturers. The census is only taken once in 10 years; it is a work of the greatest importance, present and future, and all who are called upon for information should consider it one of the duties of citizenship to give it fully and correctly. So far as our influence goes, we shall use it to stimulate manufacturers of iron and steel to discharge their duty; but we fear that too much is asked, and are inclined to believe that with fewer and more general questions the information gathered would be fuller and better.

Some Unbusinesslike Practices in the Iron Trade.

During the past few years, and especially since 1873, certain practices that are wholly indefensible have crept into the business methods of our iron trades. These have been in some cases the result of good nature and a willingness to "throw something in" when the manufacturer was making a good sale; but the chief cause of their existence has been the eager desire to secure orders during the hard times of the last six years. With the return of better times our manufacturers seem determined to make an effort to do away with these unbusinesslike methods. One of the most pernicious of these customs has been the selling of iron, cut to specified lengths, without demanding an extra price. No one knows better than the manufacturer the loss there is in cutting to lengths, and knowing this he also is aware that, in justice to himself, he should demand an extra price for such iron equal to the extra cost of the work and the loss resulting. Both the Eastern and Western Iron Associations have taken this matter in hand, and the members are insisting on an extra price for cutting to lengths. The price asked by the Eastern Iron Association, according to the card adopted October 16, 1879, is as follows: "Extra for cutting 'ordinary bars to specific lengths, 10 to 20

'feet, two-tenths of a cent per pound, or '\$4.80 per ton extra. Other lengths subject to special agreement." The formal statement of the Western Iron Association, which is as much a part of the card as the price, is: "Extra for cutting to lengths all 'preceding iron—all iron, including tire, 'one-tenth of a cent per pound." These conditions seem only fair and just.

A stranger custom than this seems to have grown up in the nail trade, if the indications of some resolutions passed by the Western Nail Association at its last meeting are to be credited. The resolutions are as follows:

Whereas, The pernicious and unbusinesslike practice of entering orders for nails, subject to cancellation at the option of the buyer, has resulted only in confusion and loss to the manufacturer; therefore, be it

Resolved, That hereafter all orders for nails shall be made in writing and accepted by the purchaser before said orders shall be entered and accepted by the manufacturer.

Resolved, That hereafter we pledge ourselves to enter none but bona fide orders accompanied by specifications; shipment to be at earliest convenience of mill.

Resolved, That hereafter we pledge ourselves as manufacturers not to permit cancellation of orders, but to insist on fulfillment of contracts at the price and terms agreed upon at time of sale.

Resolved, That hereafter all cards published shall contain the words: "No orders accepted unless accompanied by specifications. No orders subject to cancellation."

It seems too much to believe that men who have the reputation of being sensible business men should have allowed such a "heads I lose, tails you win" policy to exist. The meaning of these resolutions, as we understand it, is that certain Western mills have allowed customers to enter orders without specifications. If nails went up the buyer took them; if they went down he canceled the order unless he got the nails at a reduction. We can scarcely believe that all mills consented to this practice, and it is a source of gratification to those who desire to see business conducted on sound principles that this senseless practice will be done away with.

Trade Marks.

The decision of the United States Supreme Court declaring unconstitutional the national trade-mark law, of which we give an abstract in another column, is of the greatest interest to manufacturers of all classes. The trade-mark law in question was passed by Congress in July, 1870, and was warmly approved by the business community. It authorized the registration of trade-marks in the patent office, and provided the means of defending them against imitation or infringement for 30 years, with the privilege of renewal for 30 years more. The effect of this legislation was to greatly stimulate the employment of distinctive trade-marks by manufacturers. About eight thousand have been registered, and applications for the registration of some hundreds more were pending. The law was not objectionable in any other respect than that in passing it Congress assumed an extra-constitutional power. In the legal profession such a decision as that of Judge Miller has been expected; but to the business community it will no doubt be a surprise and a disappointment. As will be seen from Judge Miller's argument, the court holds that a trade-mark has no necessary relation to discovery, invention or authorship. So far as it partakes of invention, we presume it can still be protected under the law providing for the issuing of design patents; but the trade-mark which consists of a symbol, name or arbitrary word is not patentable. The court concedes the right of Congress, under the Constitution, to enact such laws as may be needed to protect trade-marks in international or interstate commerce, but finds no constitutional authority for granting them protection within the several States. This may seem like splitting hairs, but it requires only a very limited knowledge of the theory of the Federal Union to see that, even in minor matters of public convenience, Congress cannot be safely permitted to exceed its constitutional powers.

In view of this decision, it is scarcely probable that Congress will venture any new experiments in trade-mark legislation, except such as may be necessary to give validity to existing treaties, pledging protection in this country to the registered trade-marks of the subjects of certain foreign powers. In future, therefore, our manufacturers must depend for the protection of their property rights in trade-marks against infringement at home, upon common law and the legislative enactments of the several States.

Is it not about time that we had some new phrases expressive of formal sorrow, from which to draw for terms and expressions that shall enable us to dispense with the stereotyped phrases now used in resolutions of this character? Is it necessary, for example, to always preface our resolutions of respect for the dead with the preamble: "Whereas, he has pleased Almighty God to 'remove from our midst,' &c. &c. This form of expression conveys a meaning not intended, and which is as inappropriate to the occasion as it would be to give out at a funeral the hymn beginning:

"Believing, we rejoice
To see the curse removed."

Even more objectionable is the set phrase: "Resolved, that we bow in humble submission to the Divine will," &c. As resistance to the Divine will in such matters is never attempted, the formal notice of submission thereto savors of cant. Again,

why is it commonly considered desirable to exaggerate a dead man's virtues to the point of caricature? Why should he be rated for more than he was really worth in the estimation of his eulogists? The proverb which bids us speak only good of the dead does not enjoin fulsome flattery, and such flattery in resolutions of this character is ridiculous. A formal expression of regret is perhaps gratifying to surviving friends; but it would commonly be more gratifying than it is if the absurdities and exaggerations of the usual phraseology were avoided. We have no wish to discourage the natural desire of societies and corporations to tender a last compliment to departed associates; but good taste would suggest something very different from what is usually considered correct. The most entirely commendable thing in the resolution line we have seen, was lately passed by a social and benevolent society on the occasion of the death of one of its members. It read:

Whereas, We are informed of the death of our friend and advocate.
Resolved, That we are sorry to hear it, and that the Secretary is directed to write his family a suitable letter.

There is a tradition to the effect that at one time, and that not very long since, the tonnage of freight moved from and received at Pittsburgh was heavier than that of any other city in the United States. This seems a large statement, but is not so extraordinary when the details are examined. For example, in the single item of coal alone it is probable that some 9,000,000 to 10,000,000 tons are shipped East and West from Pittsburgh yearly. Add to this the iron ore, glass, lead, coke, grain, and the large amount of freight that is transferred both East and West, and while the statement may be a little exaggerated, it is so near the truth that Pittsburgh may well boast of its tonnage. In the month of October there was shipped from Pittsburgh East, on the Pennsylvania road alone, some 30,000 loaded freight cars.

The "depression" committee, having failed to find anything that is depressed, propose to depress something, so that their labor shall not be in vain. They take, as the subject of this experiment, the Chinese immigrant, who, by their own showing, is a peaceable, industrious workman, adding to the production and capital of the country, and showing his good sense by not wasting all he earns, and they proceed to "go for that heathen Chinese" in true Christian charity. If John did not live on 20 cents a day, but spent all he could make, even though it was not for food and clothing; if he would be a striker and join trades unions, he might stay; but he increases the wealth of the nation and lives economically, and must go. The depression committee should take as its motto, "Delenda est Chinese."

Mineral Statistics of Prussia for 1878.

The Prussian Ministry of Public Works has just published its usual full and detailed statistical tables of the production of the mines and metallurgical works during the year 1878, from which we take the following data: Four hundred collieries mined 35,500,167 metric tons of coal, of which 2,578,214 tons were used at the mines, while 32,921,953 tons were placed on the market. They employed 116,878 men below ground, and 26,180 men and 2264 women above ground. Lignite was hoisted from 489 mines, which turned out 8,841,366 tons. Of this amount 783,744 tons were used at the mines. The number of workmen employed was 10,316 below ground, and 7763 men and 223 women above ground. Four rock salt mines, the principal one of which is Staßfurt, are credited with a total production of 110,758 tons of salt, to which 307,950 tons of alkali salts must be added, the whole being produced with 1392 men. In Prussia there were at work during the year 1878, 549 iron mines, employing 31,991 hands, and producing 2,955,872 tons of iron ore. All the mines of coal, salt, iron and metals taken together gave work to 167,377 miners, and to 53,687 men and 6701 women working above ground, a total of what might be called the mining population of 227,765. The figures relating to the manufacture of iron are very detailed, and show some features of interest. From them we gather that there are in Prussia 44 charcoal blast furnaces, 33 of which were in blast during the year, giving employment to 1751 men, using 74,013 tons of iron ore from Prussian and 1370 tons from foreign mines, and producing 14,192 tons of pig, of which 9951 tons were used for foundry purposes, 814 tons for the manufacture of steel, and 3477 tons for puddling. A large portion—9782 tons—of the charcoal iron made is used for castings direct from the blast furnace. The whole production does not go beyond 27,482 tons. The great bulk of the pig iron production naturally comes from coke and coal blast furnaces, and of these, 128 out of a total number of 184 were in blast. Together they smelted 3,350,836 tons of Prussian, 296,768 tons of foreign ore, and 274,228 tons of cinder, the number of workmen employed being 11,213. The product was 1,534,830 tons of pig, of which 54,983 tons were foundry pig, 426,816 tons were Bessemer pig, open-hearth pig and spiegeleisen, and 1,049,830 tons were mill pig. A small amount—9635 tons—was cast directly from the blast furnace, the greater bulk being used for gas and water pipe. Besides these, two furnaces ran on mixed fuel, making the total production of pig for Prussia, 1,563,061 tons, smelted in 163 furnaces out of a total of 230, the entire force of men employed in the industry being 12,992. It is much to be regretted that the tables do not in any way afford an opportunity to ascertain the amount of spiegeleisen and ferromanganese produced. Prussia has 571 foundries, which gave

employment in 1878 to 19,415 workmen. The plant consists of 1169 cupolas, of which 892 were at work, while out of a total of 90 reverberatory furnaces, 62 were in operation. We are unable to reproduce the details of the work done, and may add only that while the German foundries used 71,296 tons of native pig, they melted 153,736 tons of foreign metal. Wrought iron is manufactured in 264 establishments, employing 36,540 men, and possessing 172 refining furnaces, 1937 puddling furnaces, 967 welding furnaces, 376 reheating furnaces, of which 123, 1318, 661 and 300 respectively, were in operation during the year under consideration. The total production was 1,123,171 tons of wrought iron and puddled steel, of which 15,481 tons were rails, 11,512 tons of fish plates, &c. While this trade has therefore been reduced to a very small volume, that of wrought iron sleepers has risen to 56,212 tons. The amount of merchant bar manufactured was 251,147 tons, and 83,272 tons of fine bars, and 63,299 tons of bridge and ship angles, tees, &c., were made. The production of plates was 74,017 tons; that of sheet, 30,318 tons, while the output of very thin sheet iron was 32,769 tons. Tin plates are in the list with 7955 tons, and wire with 168,787 tons.

There are in Prussia no less than 50 Bessemer converters, of which 25 only were in operation during the year 1878; 42 open-hearth furnaces, of which 17 were idle, and 25 crucible furnaces for the manufacture of steel, of which 8 only were at work. The latter furnaces must not be confounded with crucibles for the melting of steel, there being no less than 282 in the kingdom, of which only 74 were producing. The total production of Bessemer steel was 452,399 tons, that of open-hearth steel 51,731 tons, and that of other furnaces 568 tons. It will be seen, therefore, that the average production of a Bessemer converter was about 18,000 tons per annum. The materials used for all the steel were 366,021 tons of German pig, 100,309 tons of foreign pig, 36,592 tons of spiegeleisen, 2011 tons of German, and 534 tons of foreign ferromanganese, and 64,829 tons of old wrought iron and scrap. The whole aggregating 600,808 tons. The production of steel rails was 357,953 tons; that of axles, 9303 tons; wheels, 21,323 tons; tires, 20,228 tons; guns, 10,051 tons, and ingots, 34,010 tons. The whole number of workmen employed in the steel industry of Prussia was 13,978 tons.

The following table gives the production of metals during the year 1878:

	Metric tons.
Zinc	94,037
Lead	75,004
Litharge	3,359
Copper	12,780
Silver	9,073
Gold	0.232
Nickel	75

The total number of workmen employed in the smelting works of Prussia was 11,208.

About Pamphlets.

To the Editor of the Iron Age.—Sir: I pause, in the assortment of a lot of pamphlets for the binder, to "blow up" some first-rate engineers, whose monographs would be vastly more valuable if they had dates. Contemporaries may know when they were written, but we assert and bind pamphlets chiefly to aid our professional successors. The value of a monograph consists, historically—I might say technically—in its presentation of art, plan and criticism at the date of its issue.

The papers without date are chiefly reprints from the transactions of learned societies. I lately had to refer, in a desperate hurry, to one of —'s papers for some datum lines, but he didn't datum, and I spoiled half a day going over the *Journal of the Franklin Institute* in a public library. I think I am entitled to damages.

I wish that engineers and others—more especially others—would appreciate the value of monographs, usually issued in pamphlet form. They are the current literature of arts which are in a transition state. Who would write a text book about iron and steel to-day?

The publications of the United States Government (not often pamphlets) are sometimes of immense value, but they get into the wrong hands. For instance, only one civilian member of the late United States Test Board has received from the Ordnance Department the voluminous and important reports of the board. Technical reports printed by order of Congress are usually pearls cast before swine. The most valuable pamphlets are often found (uncut) in the lumber rooms of commercial gentlemen to whom they are sent as a compliment. How many engineers have the report of Chanute, Barnard and Gillmore on the proposed Blackwell's Island Bridge—a perfect mine of long-span information?

Referring again to dates, engineers, experts and patent lawyers who have constant occasion to refer to the "state of the art," are very often delayed and embarrassed for the want of dates, not only of descriptive pamphlets, but of the things and occurrences described in them; and for the want—I may say in passing—of specific descriptions and information.

These remarks refer not only to professional papers on the state of the art, but to manufacturers' circulars, which are often scientific papers of great value. Manufacturers may comfort themselves with the assurance that if they do not always win orders by their elaborate circulars, they at least contribute to the history of their industry, if they only give dates.

A. L. HOLLEY.

The Consumption of Steel for Making Fences.—The extraordinary progress made in very recent years in the use of barb wire for fencing, has caused some inquiry as to the quantity of material which is now worked up for use in this form in the United States. In reply to a letter from the editor of the *Bulletin*, of Worcester, Mass., say: "It is estimated that 15,000 tons of finished barb fencing have been made and sold during the present calendar year, and that 20,000 tons will be made and sold dur-

ing the next calendar year. This article is made exclusively from Bessemer steel." Mr. Douglass, the superintendent of the Gautier Steel Works, at Johnstown, Pa., states that last year the production of barb wire for fencing in the United States was about 11,000 tons; the present year it will be not less than 18,000 tons. This is, comparatively speaking, a new industry, and, as the figures show, a very important one.

The Employment of Convicts in Mechanical Trades.

A joint meeting of the States Prison Labor Commissioners of the States of Massachusetts, Connecticut and New Jersey was held recently in the St. Nicholas Hotel, this city, to discuss the questions referred to them, to be ready to make their report to the Legislatures of their various States early in the coming session. The commissions are composed of five members from New Jersey, four from Connecticut, and two from Massachusetts. The two gentlemen from Massachusetts are a sub-committee from the joint committee appointed by the Legislature of that State, and the commissioners from New Jersey and Connecticut were appointed by the governors of those States. Among the gentlemen who attended the conference were Mr. Lucius P. Deming and Mr. Edmund Tweedy, of Connecticut; Mr. Charles H. Litchman and Mr. A. P. Morse, of Massachusetts, and Mr. Samuel Allison, Mr. Edmund Bettle, and Dr. S. B. Hunt, of New Jersey. Mr. Deming was chosen chairman, and Mr. Bettle acted as secretary. These commissions have held several meetings previously, all of which have been held in executive session, and the results of their action thus far are unknown to the public. It is understood, however, that they have three propositions before them, of which the following are the main points: 1. Is the relation of the convict to labor that of repression or reformation? 2. How far can the convict be trusted or educated into the sense that all crime is a useless and hurtful folly? 3. How far shall convict labor be allowed to compete with free and honest labor in the shops outside? Of these three questions, however, the last one is considered the most important, and is receiving the greatest amount of attention and discussion at the hands of the commissions. They are trying their best to find out what is meant by all the clamor that is being made about the labor-contract system in the different prisons, and how far the alleged injury to labor outside of the prisons really extends, and what remedy, if any, can be applied. In regard to the question of reformation, it is argued that the system in vogue in the Reformatory at Elmira, in this State, is incomparable in its salutary effects on those who come under its influence and power. The main feature of that system is the parole sentence, whereby the Board of Managers have the power to parole a prisoner after he has served a certain portion of his sentence, the length of the parole depending upon the grade of crime and the conduct of the prisoner while in the institution. He is paroled, but not pardoned. He is required to report by letter every month, the letter to be indorsed by some respectable person. So long as he behaves himself he is not molested, but he may be returned to the Reformatory the moment he misbehaves himself, and it does not require a second conviction to send him back. This system is said to be much favored by the commissions, but whether they will adopt it is not definitely settled. In fact, they have so far refused to disclose what action they do intend to recommend in regard to any of the propositions under discussion, and it is understood they will not make their plans and recommendations known to the public until they are ready to report to the Legislatures or Governors of their States.

The National Trade Mark Law Declared Unconstitutional.

On the 17th inst., the United States Supreme Court decided the following cases:

No. 705.—The United States, plaintiffs, vs. *Emil Steffens*, and
No. 711.—The United States, plaintiffs, vs. *Adolph Wittenman*. On certificates of division from the Circuit Court of the United States for the Southern District of New York, and

No. 719.—The United States, plaintiffs, vs. *W. W. Johnson et al.* On certificate of division from the Circuit Court of the United States for the Southern District of Ohio.

These three cases are prosecutions for violations of what are known as the Trade Mark laws, embodied in Sections 4937 to 4947 of the Revised Statutes. The question upon which the judges of the lower courts were divided in opinion is, "whether the acts of Congress on the subject of trade marks are founded on any rightful authority in the Constitution of the United States." The following is the judgment:

It was maintained here by counsel, who sought an affirmative answer to this question, that there are two clauses of the Federal Constitution which furnish a sufficient warrant for the legislation in dispute. The first is the eighth clause of section 8, Article I, which provides that Congress shall have power to pass laws "to promote the progress of science and the useful arts by securing for limited time to authors and inventors the exclusive right to their respective writings and discoveries." With regard to this point the court holds that the ordinary trade mark has no necessary relation to invention or discovery. It is generally the outgrowth of a considerable period of use rather than of sudden invention, and is often the result of accident rather than design. The attempt to classify a trade-mark with the writings of authors is open to objections equally strong. The latter involve an element of originality as do also inventions, while the trade-mark is generally nothing more than an adoption of something already in existence as the distinctive symbol of the person using it. It does not depend upon novelty, invention, discovery or any work of the brain, but is founded simply upon priority of appropriation. The court is, therefore, of the opin-

Tables Showing the Wearing Qualities of English and American Steel Rails.

TABLE 1.—STATEMENT OF AMERICAN STEEL RAILS—WORKS NOT GIVEN (IN PENNSYLVANIA) LAID ON THE PENNSYLVANIA RAILROAD, WEST OF PHILADELPHIA.

When laid	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total.
No. of tons	1,328	5,272	7,671	10,319	18,919	10,195	11,058	6,601	5,481	4,008	2,823	92,671
Removed in 1871	...	31.62	...	6.12	...	...	...	...	...	...	...	37.74
" 1872	39.79	15.95	...	...	3.52	...	...	...	...	...	...	50.26
" 1873	0.50	9.07	4.50	17.07	8.20	3.55	...	...	...	...	...	19.98
" 1874	...	29.79	10.19	41.89	119.37	1.07	...	...	...	...	...	211.31
" 1875	44.09	284.15	151.31	403.90	19.73	0.95	5.25	0.80	...	...	...	959.48
" 1876	...	26.62	274.15	715.06	327.31	7.03	...	1.25	0.30	...	...	1,351.75
" 1877	...	3.76	807.53	941.86	677.10	125.71	135.58	38.43	30.09	...	...	2,360.00
" 1878	10.90	30.47	8.34	243.75	283.46	210.72	2.01	1.95	...	...	...	791.60
Total tons removed	86.28	421.43	665.11	2,439.65	1,438.72	543.33	142.78	42.43	30.39	...	...	5,805.19
Per cent. removed	6.49	7.99	8.67	23.54	7.61	5.28	1.29	0.65	0.56	...	...	6.26

Average life of worn-out rails, 5.07 years.

TABLE 2.—STATEMENT OF PENNSYLVANIA STEEL COMPANY'S RAILS, LAID ON THE PENNSYLVANIA RAILROAD, PHILADELPHIA TO PITTSBURGH AND BRANCHES.

When laid	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total.
Number of tons	1,272	4,023	6,949	7,405	7,204	9,257	4,465	2601.1	2028.5	290.4	1709.	47908.
Removed in 1871	...	17.17	...	...	...	...	...	...	...	...	...	17.17
" 1872	30.79	...	...	...	...	...	...	...	...	...	...	30.79
" 1873	...	3.25	14.47	...	5.55	...	...	...	...	...	...	21.27
" 1874	...	27.22	10.29	30.35	105.38	...	...	...	...	...	...	173.24
" 1875	35.63	265.08	138.84	25.67	12.10	...	5.25	...	...	...	...	482.51
" 1876	...	26.40	268.32	208.23	26.55	7.03	...	...	...	...	...	536.53
" 1877	...	207.30	521.30	123.00	165.55	...	...	...	...	...	...	1017.21
" 1878	10.90	2.67	8.34	178.47	44.81	13.00	...	...	...	...	...	258.19
Total tons removed	77.37	138.48	636.34	978.49	311.90	189.13	5.25	...	...	...	...	2536.91
Per cent. removed	6.08	8.41	9.16	13.21	4.33	2.04	0.12	...	...	...	...	5.38

* To November 1.

Average life of worn-out rails, 5.51 years.

TABLE 3.—STATEMENT OF PENNSYLVANIA STEEL COMPANY'S RAILS, LAID ON THE UNITED RAILROADS OF THE NEW JERSEY DIVISION.

When laid	1873.	1874.	1875.	1876.	1877.	1878.	Total.
Tons laid	2013.75	2756.10	4342.	3808.73	2165.90	2011.15	16637.65
Removed in 1873	1.20	...	...	...	...	...	1.20
" 1874	6.55	2.90	...	...	...	...	9.45
" 1875	3.95	3.60	...	...	...	...	7.55
" 1876	1.25	0.57	2.40	...	...	...	4.22
" 1877	2.80	1.45	2.85	0.30	0.25	...	7.65
" 1878	0.30	0.34	0.57	...	...	...	1.21
Total tons removed	16.05	8.86	5.82	0.30	0.25	...	31.28
Per cent. removed	.00797	.00321	.00134	.00088	.00023	...	.00195

Average life of worn-out rails, 1.64 years.

TABLE 4.—STATEMENT OF FOREIGN STEEL RAILS, LAID ON THE PENNSYLVANIA RAILROAD, WEST OF PHILADELPHIA.

When laid	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	Total.
Number of tons	157.	375.	1579.	4058.	2945.	1809.	1008.	2658.	14582.
Removed in 1871	...	0.67	4.76	1.17	6.67	1.23	...	...	14.52
" 1872	14.59	4.15	21.63	...	...	...	40.37
" 1873	3.56	18.27	10.45	5.91	1.70	0.25	40.14
" 1874	62.28	6.57	...	...	...	68.93
" 1875	152.88	489.46	44.83	65.76	...	...	732.91
" 1876	23.65	14.99	567.01	49.68	28.00	682.66
" 1877	7.44	585.04	17.76	115.54	0.55	666.33
" 1878	0.30	39.69	49.62	3.32	34.00	106.81
Total tons removed	...	0.67	176.09	630.31	670.83	661.01	200.38	33.48	2372.71
Per cent. removed	...	0.18	11.15	15.53	22.77	36.67	19.87	1.22	16.27

Average life of worn-out rails, 7.77 years.

ion that while such legislation as that in question may be a judicious aid to the common law on the subject of trade-marks, and may be within the competency of legislatures whose general powers embrace that class of subjects, it is not authorized by the constitutional provision concerning authors and inventors and their writings and discoveries.

The other clause of the Constitution relied on to support this legislation is the third of the same section, which provides that Congress shall have power "to regulate commerce with foreign nations, and among the several States and with the Indian tribes." The argument is that the trade-mark is used to identify a particular class or quality of goods, and that as so used it is a valuable aid or instrument of commerce, and so comes within the scope of the constitutional provision cited. With regard to this point the court observes: 1st, That the clause quoted does not bring within the control of Congress every species of property which is the subject of commerce or which is used in commerce ("Wallace vs. Louisiana," 8 How., 73; "Paul vs. Virginia," 8 Wall., 168); and 2d, That the legislation now in question does not limit the use of trade-marks to interstate or international commerce, as it should do if it be based on the constitutional provision now quoted in its support. If it refers to all trade and to commerce between all points, it is obviously the exercise of power not conferred upon Congress.

That this is the purpose of this legislation seems, in the opinion of the court, to be evident. It contemplates the establishment of a universal system of trade-mark registration for the benefit of all who have already used a trade-mark, or who wish to adopt one in future, without regard to the character of the trade to which it is to be applied, or to the locality of the owner. Such legislation is, in the opinion of this court, in excess of Congressional power. It has been argued that, if Congress have power to regulate trade-marks used in commerce with other nations and among the several States, its legislation, so far as it relates to that class of cases, should be held valid; but to this the court holds there are two objections: First, that there is nothing to show that the trade-marks in the three causes now under consideration were used in that kind of commerce; and, second, that it is not within the judicial province to give the words used by Congress a narrower meaning than they are manifestly intended to bear. The court wishes, however, to be understood as leaving the whole question of

the treaty-making power of the general government over trade-marks, and the duty of Congress to pass any laws necessary to carry such treaties into effect, untouched. The question in each of these cases, viz.: Whether these statutes can be upheld in whole or in part as valid and constitutional, must be answered in the negative, and it will be so certified to the circuit courts.—*Opinion by Justice Miller.*

Under the provisions of the Federal Trade Mark law which the Supreme Court has pronounced unconstitutional, about 8000 trade-marks have been registered at the Patent Office, and about 200 applications for registry are now pending.

Testing the East River Bridge Cables.—People who cross to and from Brooklyn by ferry are apt to look up at the great East River bridge and wonder what assurances they have that when the heavy floor is built and loaded with travel it will be safely held up by the suspending cables. These cables have just been tested by a machine which is the most elaborate and perfect of its kind in the world. It is the one planted on the government grounds at the Watertown (Mass.) Arsenal, designed by Mr. A. H. Emery, and is, indeed, a marvel of skilled construction, for it shows how many ounces are needed to break a piece of thread, and how many tons to fracture a steel beam. The apparatus is microscopic in accuracy, inasmuch that it registers, in a breaking weight of a million pounds, within one pound of the mass needed. This was the machine selected to test the suspending cables, and Messrs. William H. Payne and Isaac Newton, engineers connected with the Brooklyn Bridge, recently spent four days in the tests at the Arsenal, which is under charge of Col. T. T. S. Landley, of the Ordnance Corps. Instead of using small sections of the suspending cables, they took lengths that would make the results decisive. Not to go into technicalities, the tests were entirely satisfactory, and showed that the precautions taken in putting together the parts were ample for their purpose. The suspending cables were found by the engineers to possess a strength much greater than is required to resist the strain that will be put upon them in actual use. A thought suggested by this test is that it is a matter of regret that a machine so useful should be left on one side of the central lines of iron and steel construction. It cost the government nearly \$100,000, and it would be well to have it used freely by the people.

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AND
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A curious feature in a large number of strikes for advances in wages that we have chronicled lately, is that they have been of the employees of workmen against the workmen. In various sections of the country, for example, the puddlers' and heaters' and rollers' helpers—who are not paid directly by the mill, but by the puddlers, heaters and rollers themselves—have been forced to strike for what they considered "their rights." The employees of the melters at steel works have done the same in a number of instances lately. It is amusing to see how little the labor papers have to say about these strikes. We do not recall a strike that has been undertaken by a puddler, or a heater, or a roller, that has not been heralded forth as a blow for freedom against crushing tyranny. There is a certain set of phrases that, for want of a better term, may be called "red-hot," which

are very useful to writers and speakers on labor subjects, but they do not seem to be used about the strikes of those who strike against workmen. Are not such conflicts as these between capital and labor to be recognized? The workman who employs another becomes at once one of the employer class, who, in ordinary language, are called capitalists. Are not the rights of these laborers against the grinding oppression of their grasping capitalists to be noticed? We commend this subject to the consideration of professional agitators.

The Quality of American and English Steel Rails.

Mr. James M. Swank, secretary of the American Iron and Steel Association, whose untiring efforts to promote the interests of American iron industries are everywhere recognized, has just published a pamphlet which is well calculated to put a stop to the unjust and unwarranted attacks made upon the manufacturers of steel rails in this country. In taking upon himself the burden of proof in a question which has been the subject of much newspaper controversy in this country and abroad, Mr. Swank has assumed a delicate and difficult task. It has been stated time and again by English newspapers and by a portion of the American daily press, that the only reason why English rails were purchased in this country was that some of our prominent railroad men had discovered that, owing to their superior quality, it was more economical, all things considered, to buy the foreign product at a higher price than to lay down the cheaper American rail. Although these assertions were not backed by anything more authoritative than the vague statements of interested parties, the fact that they could be met only by strong expressions of preference for American rails coming from experienced railroad men, and not by actual figures, was looked upon by many as a tacit admission of the relation between the rival rails. Mr. Swank, ignoring the absence of any proof in support of the assertions of those desiring to injure American interests, has sought to furnish a direct and final reply, by gathering figures showing the results of actual experience with American and English rails on American railroads. How largely he has been successful in this will be readily appreciated by a close study of the tables which we publish elsewhere. It is to be regretted that only one road besides that to which we referred in our issue of *The Iron Age* of June 26, 1879, has apparently kept a trustworthy record of the number of rails removed as defective from its tracks. Limited as the data are when compared to the enormous quantities of rails in use in this country, they are highly valuable, as they come from representative roads.

Referring to the figures given in the first table, Mr. Swank states that the exceptionally bad character of the rails made in 1871 was due to the fact that the scarcity of all kinds of pig iron in that year and the urgent needs of the railroads combined to prevent a careful selection of the pig by the Bessemer manufacturers. The same influences may be traced in the figures given in the second table. Mr. Swank then proceeds to consider the relation of the average life of foreign rails removed from the track to that of the American rails. The fact that this is favorable to the former is attributed by him to the circumstance that foreign rails laid down were subjected before shipment, for commercial reasons, to a stricter inspection than American rails, and partly also because English makers ten years ago had the great advantage of having ten years experience in manufacture, while Americans were beginning to feel their way. The tables show that while the quality of American rails steadily improved from year to year, there are indications of the reverse with the product of foreign works. Mr. Swank justly points out that the life of removed rails has little importance compared with the percentage rendered unfit for service from various causes. We believe, however, that by using the general averages given in his tables, he does not express the true relation between the two classes of rails. The experience of the Pennsylvania Railroad, as revealed by the figures given, furnishes strong evidence in favor of the high quality of American steel rails, even if no allowance is made for the serious damage done to their reputation by the exceptional circumstances of 1871. The percentage of rails removed, or, in other words, the number which after a given time become defective, is a true test of their quality. A glance at the tables will clearly show that with all rails, American as well as English, the number of removals during the first few years is very small; then there is a sudden increase, culminating rapidly, and diminishing again after one or two years. Those which have resisted destruction during this period may be looked upon as likely to be serviceable until diminished too much in weight by abrasive action to be safe. Now, the general averages deduced from the tables of wear of American rails include a considerable number of rails which have been in service only a short time. What the figures obtained from such rails are is readily discernible from Table 3, where both the average life of worn-out rails and the percentage of rails removed is very low. Where, therefore, recent years are introduced into the comparison, we will find both figures diminished. Averages drawn from tables which in one case include recently laid rails, and in the other

case do not, are not therefore fairly comparable. When the object is to contrast American and foreign rails they should be placed on equality, both in this respect and in regard to the time at which both were laid, so that the tonnage, &c., may be considered to be equal in both cases. In order to do this we have taken the group of four years, 1868-69-70-71, as giving the longest term of service of the American rails and fairly representing the foreign ones. We find, by calculation, the following figures:

	American.	Pennsylvania.	Foreign.
Total laid, tons.....	24,593	19,650	8,413
removed, tons.....	3,602.47	2,030.63	1,505.64
Average life of removed rails, years.....	5.50	5.89	7.59
Per cent. removed.....	14.64	10.33	18.61

These figures are a conclusive and final answer to all clamor in regard to the quality of American steel rails, which, it will be seen, have been of superior quality, even in times when American Bessemer practice had not yet acquired that precision and uniformity which have since characterized it.

Mr. Swank deserves great credit for having thus vindicated American steel rail makers; and while we differ from him somewhat in the numerical conclusions which he draws from the tables of results obtained by the Pennsylvania Railroad, we fully agree with him in his strong claims for the American rails. These claims, it is true, are somewhat modified as regards the figures by our version of the comparison, but they are fully justified by the facts.

The Census of 1880 and the Iron Trades.

The preparations for the census of 1880 are, no doubt, very elaborate, and we presume it is intended to cover as much ground and make the statistics collected as accurate as may be; but it is just possible that the matter will be overdone in these respects, and that manufacturers will be asked more questions than they are willing or have time to answer. From a copy sent us of the list of questions to be asked of ironmasters, and which is much too long for our columns, we think that those who contemplate answering them fully and honestly, would do well to have a history of their works and operations for the 12 months ended May 31st, 1880, prepared in advance. For example, the blast furnace men are asked the following list of questions:

Name of corporation, firm or individual operating the works.

Name of place, county and State where your works are located.

Whole amount of capital (real and personal) invested in the works you operate (whether owned or leased) and in your business.

What is the value of your buildings and of your machinery separately?

Kind of power—steam, water, wind or land.

If steam power, give the number of boilers, number of engines, total horse power and quantity of fuel used daily.

If water power, state on what river or stream, available head of water, kind of wheels and number, diameter and breadth of wheels, revolutions per minute, total horse power.

Number of persons employed—males of 16 years and upward, below 16 years; females of 15 years and upward, below 15 years.

Total amount paid in wages during the year.

Number of months in active operation during the year.

Number of completed blast-furnace stacks.

Total daily capacity, in tons, of melted metal.

Name the raw materials used—kind of ore, kind of fuel, kind of flux.

Tons of iron ore used, value.

Tons of fluxing material used, value.

Bushels of charcoal used, value.

Tons of anthracite coal used, value.

Tons of raw bituminous coal used, value.

Tons of coke used, value.

Give tons and value of all other materials used in the furnace.

Tons of cold-blast charcoal pig iron produced, value.

Tons of hot-blast charcoal pig iron produced, value.

Tons of anthracite pig iron produced, value.

Tons of bituminous coal and coke pig iron produced, value.

Tons of mixed anthracite and coke pig iron produced, value.

Tons of castings produced direct from the furnace and not included in the foregoing, value.

Value of all other work done, including jobbing and repairing.

Average number of hours of labor of your workmen per week.

Average wages per day of skilled workmen.

Average wages per day of unskilled workmen.

How many of your workmen live in their own houses?

How many of the workmen ordinarily employed by you are now unemployed through scarcity of work?

Please give an account of any strikes which may have occurred in your establishment during the past year, stating the question at issue, and duration and result of strike, with all facts pertinent thereto.

The questions for the rolling-mill men include most of the above, with others relating to materials and products which demand a detailed statement of the entire business operations of the mill for a year, including every detail. For example:

Tons of iron ore used, value.

Tons of pig iron used, value.

Tons of old iron rails used, value.

Tons of other old scrap iron used, value.

Tons of hammered ore blooms used, value.

Tons of hammered pig or scrap blooms used, value.

Tons of purchased muck bar used, value.

Bushels of charcoal used, value.

Tons of anthracite coal used, value.

Tons of bituminous coal used, value.

Tons of coke used, value.

Tons and value of each other material used in manufacture.

Tons of bar iron produced, value.

Tons of rod iron produced, value.

Tons of angles, beams, channels and other structural iron produced, value.

Tons of skelp iron produced, value.

Tons of rolled iron car axles produced, value.

Tons of hammered iron car axles produced, value.

Tons of iron rails produced, value.

Tons of muck bar produced for sale, value.

Tons of sheet iron produced, value.

Tons of boiler-plate iron produced, value.

Tons of nail-plate iron produced, value.

Tons of all other plate iron produced, value.

Tons of hoop iron produced, value.

Tons and value of each other kind of rolled iron produced.

Tons and value of each other kind of hammered iron produced.

Tons and value of each other finished product made.

All other work done, including jobbing and repairing, value.

Similar questions, with such modifications and additions as may be necessary, are put to the makers of the several kinds of steel.

If the information asked for is obtained, the statistics gathered will be the most valuable ever brought together—invaluable, indeed, to the future student of the nation's industrial progress. But we have no idea it will be obtained. Not one in ten of our ironmasters have the information called for in available shape. To pick it out of their various books would take time and interfere with the regular work of their clerks. For this reason many of those who are disposed to give the information, will be more likely to guess at the figures than to "speak by the card." There are many of another, and perhaps larger, class, who will consider the questions inquisitorial and object to answering them on general principles. Few manufacturers like to make so full an exhibit of their business as these questions demand; for while it is understood that the items will not be published, no one who makes out such a statement and signs it can be sure that it will not be seen by some one who has no right to see it. In the case of information of a statistical character regularly given to Mr. Swank for the Iron and Steel Association reports, or to Mr. Weeks for *The Iron Age* quarterly blast-furnace tables, they have all the guarantee which insure the sacredness of private correspondence with reputable gentlemen. The same would be true of private correspondence with General Walker; but we fear that many will object to making out such statements when it is likely they will pass through the hands of sundry clerks and irresponsible subordinates. Such suspicions are probably founded on nothing more substantial than a bare possibility of the information being used irregularly and in ways not authorized by General Walker; but many are naturally and habitually averse to giving such information to any one.

A third and large class will answer most of the questions requiring exact answers by "a good guess and multiply by two." The habit of using "round numbers" for all figures, and "lumping" all quantities, is one that grows by indulgence, and as the census questions afford a good chance for any amount of exaggeration, we shall be surprised if some good people do not take advantage of it in the hope that somebody will see their statements, and with a vague idea that it is well to make as fair a showing as possible, to compensate for the omissions inevitable in census taking. But perhaps the greatest danger of all is that which will result from indifference on the part of the trade. A majority of our ironmasters will probably decide to give the information fully and correctly, but the work will be postponed with the intention of having it done when more convenient, and the "more convenient" season will never come.

We are heartily sorry that we cannot see a prospect of getting the information called for promptly and accurately from all classes of manufacturers. The census is only taken once in 10 years; it is a work of the greatest importance, present and future, and all who are called upon for information should consider it one of the duties of citizenship to give it fully and correctly. So far as our influence goes, we shall use it to stimulate manufacturers of iron and steel to discharge their duty; but we fear that too much is asked, and are inclined to believe that with fewer and more general questions the information gathered would be fuller and better.

Some Unbusinesslike Practices in the Iron Trade.

During the past few years, and especially since 1873, certain practices that are wholly indefensible have crept into the business methods of our iron trades. These have been in some cases the result of good nature and a willingness to "throw something in" when the manufacturer was making a good sale; but the chief cause of their existence has been the eager desire to secure orders during the hard times of the last six years.

With the return of better times our manufacturers seem determined to make an effort to do away with these unbusinesslike methods. One of the most pernicious of these customs has been the selling of iron, cut to specified lengths, without demanding an extra price. No one knows better than the manufacturer the loss there is in cutting to lengths, and knowing this he also is aware that, in justice to himself, he should demand an extra price for such iron equal to the extra cost of the work and the loss resulting. Both the Eastern and Western Iron Associations have taken this matter in hand, and the members are insisting on an extra price for cutting to lengths. The price asked by the Eastern Iron Association, according to the card adopted October 16, 1879, is as follows: "Extra for cutting 'ordinary bars to specific lengths, 10 to 20

'feet, two-tenths of a cent per pound, or '\$4.80 per ton extra. Other lengths subject to special agreement.' The formal statement of the Western Iron Association, which is as much a part of the card as the price, is: 'Extra for cutting to lengths all 'preceding iron—all iron, including tire, 'one-tenth of a cent per pound.' These conditions seem only fair and just.

A stranger custom than this seems to have grown up in the nail trade, if the indications of some resolutions passed by the Western Nail Association at its last meeting are to be credited. The resolutions are as follows:

Whereas, The pernicious and unbusinesslike practice of entering orders for nails, subject to cancellation at the option of the buyer, has resulted only in confusion and loss to the manufacturer; therefore, be it

Resolved, That hereafter all orders for nails shall be made in writing and accepted by the purchaser before said orders shall be entered and accepted by the manufacturer.

Resolved, That hereafter we pledge ourselves to enter none but bona fide orders accompanied by specifications; shipment to be at earliest convenience of mill.

Resolved, That hereafter we pledge ourselves as manufacturers not to permit cancellation of orders, but to insist on fulfillment of contracts at the price and terms agreed upon at time of sale.

Resolved, That hereafter all cards published shall contain the words: "No orders accepted unless accompanied by specifications. No orders subject to cancellation."

It seems too much to believe that men who have the reputation of being sensible business men should have allowed such a "heads I lose, tails you win" policy to exist. The meaning of these resolutions, as we understand it, is that certain Western mills have allowed customers to enter orders without specifications. If nails went up the buyer took them; if they went down he canceled the order unless he got the nails at a reduction. We can scarcely believe that all mills consented to this practice, and it is a source of gratification to those who desire to see business conducted on sound principles that this senseless practice will be done away with.

The decision of the United States Supreme Court declaring unconstitutional the national trade-mark law, of which we give an abstract in another column, is of the greatest interest to manufacturers of all classes. The trade-mark law in question was passed by Congress in July, 1870, and was warmly approved by the business community. It authorized the registration of trade-marks in the patent office, and provided the means of defending them against imitation or infringement for 30 years, with the privilege of renewal for 30 years more. The effect of this legislation was to greatly stimulate the employment of distinctive trade-marks by manufacturers. About eight thousand have been registered, and applications for the registration of some hundreds more were pending. The law was not objectionable in any other respect than that in passing it Congress assumed an extra-constitutional power. In the legal profession such a decision as that of Judge Miller has been expected; but to the business community it will no doubt be a surprise and a disappointment. As will be seen from Judge Miller's argument, the court holds that a trade-mark has no necessary relation to discovery, invention or authorship. So far as it partakes of invention, we presume it can still be protected under the law providing for the issuing of design patents; but the trade-mark which consists of a symbol, name or arbitrary word is not patentable. The court concedes the right of Congress, under the Constitution, to enact such laws as may be needed to protect trade-marks in international or interstate commerce, but finds no constitutional authority for granting them protection within the several States. This may seem like splitting hairs, but it requires only a very limited knowledge of the theory of the Federal Union to see that, even in minor matters of public convenience, Congress cannot be safely permitted to exceed its constitutional powers.

In view of this decision, it is scarcely probable that Congress will venture any new experiments in trade-mark legislation, except such as may be necessary to give validity to existing treaties, pledging protection in this country to the registered trade-marks of the subjects of certain foreign powers. In future, therefore, our manufacturers must depend for the protection of their property rights in trade-marks against infringement at home, upon common law and the legislative enactments of the several States.

Is it not about time that we had some new phrases expressive of formal sorrow, from which to draw for terms and expressions that shall enable us to dispense with the stereotyped phrases now used in resolutions of this character? It is necessary, for example, to always preface our resolutions of respect for the dead with the preamble: "Whereas, it has pleased Almighty God to 'remove from our midst,' &c. &c. This form of expression conveys a meaning not intended, and which is as inappropriate to the occasion as it would be to give out at a funeral the hymn beginning:

"Believing, we rejoice
To see the curse removed."

Even more objectionable is the set phrase: "Resolved, that we bow in humble submission to the Divine will." &c. As resistance to the Divine will in such matters is never attempted, the formal notice of submission thereto savors of cant. Again,

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why is it commonly considered desirable to exaggerate a dead man's virtues to the point of caricature? Why should he be rated for more than he was really worth in the estimation of his eulogists? The proverb which bids us speak only good of the dead does not enjoin fulsome flattery, and such flattery in resolutions of this character is ridiculous. A formal expression of regret is perhaps gratifying to surviving friends; but it would commonly be more gratifying than it is if the absurdities and exaggerations of the usual phraseology were avoided. We have no wish to discourage the natural desire of societies and corporations to tender a last compliment to departed associates; but good taste would suggest something very different from what is usually considered correct. The most entirely commendable thing in the resolution line we have seen, was lately passed by a social and benevolent society on the occasion of the death of one of its members. It read:

Whereas, We are informed of the death of our friend and advocate,

Resolved, That we are sorry to hear it, and that the Secretary is directed to write his family a suitable letter.

There is a tradition to the effect that at one time, and that not very long since, the tonnage of freight moved from and received at Pittsburgh was heavier than that of any other city in the United States. This seems a large statement, but is not so extraordinary when the details are examined. For example, in the single item of coal alone it is probable that some 9,000,000 to 10,000,000 tons are shipped East and West from Pittsburgh yearly. Add to this the iron ore, glass, lead, coke, grain, and the large amount of freight that is transferred both East and West, and while the statement may be a little exaggerated, it is so near the truth that Pittsburgh may well boast of its tonnage. In the month of October there was shipped from Pittsburgh East, on the Pennsylvania road alone, some 30,000 loaded freight cars.

The "depression" committee, having failed to find anything that is depressed, propose to depress something, so that their labor shall not be in vain. They take, as the subject of this experiment, the Chinese immigrant, who, by their own showing, is a peaceable, industrious workman, adding to the production and capital of the country, and showing his good sense by not wasting all he earns, and they proceed to "go for that heathen Chinese" in true Christian charity. If John did not live on 20 cents a day, but spent all he could make, even though it was not for food and clothing; if he would be a striker and join trades unions, he might stay; but he increases the wealth of the nation and lives economically, and must go. The depression committee should take as its motto, "Delenda est China."

Mineral Statistics of Prussia for 1878.

The Prussian Ministry of Public Works has just published its usual full and detailed statistical tables of the production of the mines and metallurgical works during the year 1878, from which we take the following data: Four hundred collieries mined 35,500,167 metric tons of coal, of which 2,578,214 tons were used at the mines, while 32,921,953 tons were placed on the market. They employed 116,878 men below ground, and 26,180 men and 2264 women above ground. Lignite was hoisted from 489 mines, which turned out 8,411,366 tons. Of this amount 783,744 tons were used at the mines. The number of workmen employed was 10,316 below ground, and 7763 men and 223 women above ground. Four rock salt mines, the principal one of which is Stassfurt, are credited with a total production of 110,758 tons of salt, to which 307,950 tons of alkali salts must be added, the whole being produced with 1392 men. In Prussia there were at work during the year 1878, 549 iron mines, employing 21,991 hands, and producing 2,955,872 tons of iron ore. All the mines of coal, salt, iron and metals taken together gave work to 167,377 miners, and to 53,687 men and 6701 women working above ground, a total of what might be called the mining population of 227,765. The figures relating to the manufacture of iron are very detailed, and show some features of interest. From them we gather that there are in Prussia 44 charcoal blast furnaces, 33 of which were in blast during the year, giving employment to 1751 men, using 74,013 tons of iron ore from Prussian and 1370 tons from foreign mines, and producing 14,192 tons of pig, of which 9951 tons were used for foundry purposes, 814 tons for the manufacture of steel, and 3477 tons for puddling. A large portion—882 tons—of the charcoal iron made is used for castings direct from the blast furnace. The whole production does not go beyond 27,482 tons. The great bulk of the pig iron production naturally comes from coke and coal blast furnaces, and of these, 128 out of a total number of 184 were in blast. Together they smelted 3,350,836 tons of Prussian, 296,768 tons of foreign ore, and 274,228 tons of cinder, the number of workmen employed being 11,213. The product was 1,534,830 tons of pig, of which 54,983 tons were foundry pig, 426,816 tons were Bessemer pig, open-hearth pig and spiegel-eisen, and 1,040,830 tons were mill pig. A small amount—9635 tons—was cast directly from the blast furnace, the greater bulk being used for gas and water pipe. Besides these, two furnaces ran on mixed fuel, making the total production of pig for Prussia, 1,563,661 tons, smelted in 163 furnaces out of a total of 230, the entire force of men employed in the industry being 12,992. It is much to be regretted that the tables do not in any way afford an opportunity to ascertain the amount of spiegel-eisen and ferromanganese produced. Prussia has 571 foundries, which gave

employment in 1878 to 19,415 workmen. The plant consists of 1109 cupolas, of which 802 were at work, while out of a total of 90 reverberatory furnaces, 62 were in operation. We are unable to reproduce the details of the work done, and may add only that while the German foundries used 71,296 tons of native pig, they melted 153,736 tons of foreign metal. Wrought iron is manufactured in 264 establishments, employing 36,540 men, and possessing 172 refining furnaces, 1937 puddling furnaces, 967 welding furnaces, 376 reheating furnaces, of which 123, 1318, 661 and 300 respectively, were in operation during the year under consideration. The total production was 1,123,171 tons of wrought iron and puddled steel, of which 15,481 tons were rails, 11,512 tons of fish plates, &c. While this trade has therefore been reduced to a very small volume, that of wrought iron sleepers has risen to 56,212 tons. The amount of merchant bar manufactured was 261,147 tons, and 83,272 tons of fine bars, and 63,299 tons of bridge and ship angles, tees, &c., were made. The production of plates was 74,017 tons; that of sheet, 30,318 tons, while the output of very thin sheet iron was 32,769 tons. Tin plates in the list with 7955 tons, and wire with 168,787 tons.

There are in Prussia no less than 50 Bessemer converters, of which 25 only were in operation during the year 1878; 42 open-hearth furnaces, of which 17 were idle, and 25 crucible furnaces for the manufacture of steel, of which 8 only were at work. The latter furnaces must not be confounded with crucibles for the melting of steel, there being no less than 282 in the kingdom, of which only 74 were producing. The total production of Bessemer steel was 452,399 tons, that of open-hearth steel 51,731 tons, and that of other furnaces 568 tons. It will be seen, therefore, that the average production of a Bessemer converter was about 18,000 tons per annum. The materials used for all the steel were 366,021 tons of German pig, 100,309 tons of foreign pig, 36,592 tons of spiegel-eisen, 2011 tons of German, and 534 tons of foreign ferromanganese, and 64,829 tons of old wrought iron and scrap, the whole aggregating 600,808 tons. The production of steel rails was 357,953 tons, that of axles, 9303 tons; wheels, 21,323 tons; tires, 20,228 tons; guns, 10,051 tons, and ingots, 34,010 tons. The whole number of workmen employed in the steel industry of Prussia was 13,978 tons.

The following table gives the production of metals during the year 1878:

	Metric tons.
Zinc	94,637
Lead	75,001
Litharge	3,359
Copper	9,073
Silver	128,786
Gold	0,232
Nickel	75

The total number of workmen employed in the smelting works of Prussia was 11,208.

About Pamphlets.

To the Editor of the Iron Age.—Sir: I pause, in the assortment of a lot of pamphlets for the binder, to "blow up" some first-rate engineers, whose monographs would be vastly more valuable if they had dates. Contemporaries may know when they were written, but we assert and bind pamphlets chiefly to aid our professional successors. The value of a monograph consists, historically—I might say technically—in its presentation of art, plan and criticism at the date of its issue.

The papers without date are chiefly reprints from the transactions of learned societies. I lately had to refer, in a desperate hurry, to one of —'s papers for some datum lines, but he didn't datum, and I spoiled half a day going over the *Journal of the Franklin Institute* in a public library. I think I am entitled to damages.

I wish that engineers and others—more especially others—would appreciate the value of monographs, usually issued in pamphlet form. They are the current literature of arts which are in a transition state. Who would write a text book about iron and steel to-day?

The publications of the United States Government (not often pamphlets) are sometimes of immense value, but they get into the wrong hands. For instance, only one civilian member of the late United States Test Board has received from the Ordnance Department the voluminous and important reports of the board. Technical reports printed by order of Congress are usually pearls cast before swine. The most valuable pamphlets are often found (uncut) in the lumber rooms of commercial gentlemen to whom they are sent as a compliment.

How many engineers have the report of Chanute, Barnard and Gillmore on the proposed Blackwell's Island Bridge—a perfect mine of long-span information? Referring again to dates, engineers, experts and patent lawyers who have constant occasion to refer to the "state of the art," are very often delayed and embarrassed for the want of dates, not only of descriptive pamphlets, but of the things and occurrences described in them; and for the want—I may say in passing—of specific descriptions and information.

These remarks refer not only to professional papers on the state of the art, but to manufacturers' circulars, which are often scientific papers of great value. Manufacturers may comfort themselves with the assurance that if they do not always win orders by their elaborate circulars, they at least contribute to the history of their industry, if they only give dates.

A. L. HOLLEY.

The Consumption of Steel for Making Fences.—The extraordinary progress made in very recent years in the use of barb wire for fencing, has caused some inquiry as to the quantity of material which is now worked up for use in this form in the United States. In reply to a letter from the editor of the *Bulletin*, the Washburn & Moen Manufacturing Company, of Worcester, Mass., say: "It is estimated that 15,000 tons of finished barb fencing have been made and sold during the present calendar year, and that 20,000 tons will be made and sold dur-

ing the next calendar year. This article is made exclusively from Bessemer steel." Mr. Douglass, the superintendent of the Gautier Steel Works, at Johnstown, Pa., states that last year the production of barb wire for fencing in the United States was about 11,000 tons; the present year it will be not less than 18,000 tons. This is, comparatively speaking, a new industry, and, as the figures show, a very important one.

The Employment of Convicts in Mechanical Trades.

A joint meeting of the States Prison Labor Commissioners of the States of Massachusetts, Connecticut and New Jersey was held recently in the St. Nicholas Hotel, this city, to discuss the questions referred to them, to be ready to make their report to the Legislatures of their various States early in the coming session. The commissions are composed of five members from New Jersey, four from Connecticut, and two from Massachusetts. The two gentlemen from Massachusetts are a sub-committee from the joint committee appointed by the Legislature of that State, and the commissioners from New Jersey and Connecticut were appointed by the governors of those States. Among the gentlemen who attended the conference were Mr. Lucius P. Deming and Mr. Edmund Tweedy, of Connecticut; Mr. Charles H. Litchman and Mr. A. P. Morse, of Massachusetts, and Mr. Samuel Allison, Mr. Edmund Bettie, and Dr. S. B. Hunt, of New Jersey. Mr. Deming was chosen chairman, and Mr. Bettie acted as secretary. These commissions have held several meetings previously, all of which have been held in executive session, and the results of their action thus far are unknown to the public. It is understood, however, that they have three propositions before them, of which the following are the main points: 1. Is the relation of the convict to labor that of repression or reformation? 2. How far can the convict be trusted or educated into the sense that all crime is a useless and hurtful folly? 3. How far shall convict labor be allowed to compete with free and honest labor in the shops outside? Of these three questions, however, the last one is considered the most important, and is receiving the greatest amount of attention and discussion at the hands of the commissions. They are trying their best to find out what is meant by all the clamor that is being made about the labor-contract system in the different prisons, and how far the alleged injury to labor outside of the prisons really extends, and what remedy, if any, can be applied. In regard to the question of reformation, it is argued that the system in vogue in the Reformatory at Elmira, in this State, is incomparable in its salutary effects on those who come under its influence and power. The main feature of that system is the parole sentence, whereby the Board of Managers have the power to parole a prisoner after he has served a certain portion of his sentence, the length of the parole depending upon the grade of crime and the conduct of the prisoner while in the institution. He is paroled, but not pardoned. He is required to report by letter every month, the letter to be indorsed by some respectable person. So long as he behaves himself he is not molested, but he may be returned to the Reformatory the moment he misbehaves himself, and it does not require a second conviction to send him back. This system is said to be much favored by the commissioners, but whether they will adopt it is not definitely settled. In fact, they have so far refused to disclose what action they do intend to recommend in regard to any of the propositions under discussion, and it is understood they will not make their plans and recommendations known to the public until they are ready to report to the Legislatures or Governors of their States.

The National Trade Mark Law Declared Unconstitutional.

On the 17th inst., the United States Supreme Court decided the following cases:

No. 705.—The United States, plaintiffs, vs. *Emil Steffens*, and

No. 711.—The United States, plaintiffs, vs. *Adolph Wittenman*. On certificates of division from the Circuit Court of the United States for the Southern District of New York, and

No. 719.—The United States, plaintiffs, vs. *W. W. Johnson et al.* On certificate of division from the Circuit Court of the United States for the Southern District of Ohio.

These three cases are prosecutions for violations of what are known as the Trade Mark laws, embodied in Sections 4937 to 4947 of the Revised Statutes. The question upon which the judges of the lower courts were divided in opinion is, "whether the acts of Congress on the subject of trade marks are founded on any rightful authority in the Constitution of the United States." The following is the judgment:

It was maintained here by counsel, who sought an affirmative answer to this question, that there are two clauses of the Federal Constitution which furnish a sufficient warrant for the legislation in dispute. The first is the eighth clause of section 8, Article I, which provides that Congress shall have power to pass laws "to promote the progress of science and the useful arts by securing for limited time to authors and inventors the exclusive right to their respective writings and discoveries." With regard to this point the court holds that the ordinary trade mark has no necessary relation to invention or discovery. It is generally the outgrowth of a considerable period of use rather than of sudden invention, and is often the result of accident rather than design. The attempt to classify a trade-mark with the writings of authors is open to objections equally strong. The latter involve an element of originality as do also inventions, while the trade-mark is generally nothing more than an adoption of something already in existence as the distinctive symbol of the person using it. It does not depend upon novelty, invention, discovery or any work of the brain, but is founded simply upon priority of appropriation. The court is, therefore, of the opin-

Tables Showing the Wearing Qualities of English and American Steel Rails.

TABLE 1.—STATEMENT OF AMERICAN STEEL RAILS—WORKS NOT GIVEN (IN PENNSYLVANIA) LAID ON THE PENNSYLVANIA RAILROAD, WEST OF PHILADELPHIA.

When laid	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total.
No. of tons	1,398	5,275	7,671	10,310	18,012	10,195	11,058	6,601	5,481	4,908	2,823	90,671
Removed in 1871	...	31.65	...	6.12	...	...	...	...	...	...	...	37.74
" 1872	...	39.79	15.95	...	3.52	...	...	...	...	...	...	50.26
" 1873	...	0.50	0.07	4.50	17.07	8.20	3.55	...	...	...	...	29.99
" 1874	29.79	19.19	41.80	110.37	1.07	...	...	...	...	211.31
" 1875	...	44.09	284.15	151.31	403.90	10.73	0.25	5.45	0.80	...	...	979.48
" 1876	...	26.59	274.15	715.06	327.34	7.03	...	1.25	0.30	...	...	1,311.73
" 1877	...	3.70	207.53	941.86	977.10	327.71	135.12	38.43	30.09	...	...	2,360.00
" 1878	...	10.90	20.47	8.34	243.75	283.46	210.72	2.01	1.05	...	...	731.60
Total tons removed	...	86.38	421.43	1,651.11	2,429.65	1,438.72	548.33	142.78	49.43	30.39	...	5,805.78
Per cent. removed	...	6.49	7.99	8.67	23.54	7.61	2.85	1.29	0.65	0.56	...	6.26

Average life of worn-out rails, 5.07 years.

TABLE 2.—STATEMENT OF PENNSYLVANIA STEEL COMPANY'S RAILS, LAID ON THE PENNSYLVANIA RAILROAD.—PHILADELPHIA AND PITTSBURGH AND BRANCHES.

When laid	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total.
Number of tons	1,272	4,023	6,949	7,406	7,224	9,257	4,455	3,601.1	2,028.5	2,904	1709.	47,908.
Removed in 1871	...	17.17	...	...	...	...	...	...	...	...	...	17.17
" 1872	...	30.70	...	...	...	...	...	...	...	...	...	30.70
" 1873	3.85	14.47	...	...	...	...	...	...	...	21.27
" 1874	27.22	10.39	30.35	105.38	...	...	...	...	...	173.94
" 1875	35.63	265.02	128.84	25.67	12.10	...	...	...	...	489.11
" 1876	26.40	268.38	208.23	26.55	7.03	...	...	...	...	536.51
" 1877	207.30	521.30	123.06	165.55	...	...	...	...	1,017.21
" 1878	10.90	2.67	8.34	178.47	44.81	13.00	...	...	...	256.19
Total tons removed	...	77.32	138.48	636.34	978.49	311.90	189.13	5.25	...	...	...	2,536.91
Per cent. removed	...	6.08	8.41	9.16	13.21	4.33	2.04	0.12	...	...	...	5.38

* To November 1.

Average life of worn-out rails, 5.51 years.

TABLE 3.—STATEMENT OF PENNSYLVANIA STEEL COMPANY'S RAILS, LAID ON THE UNITED RAILROADS OF THE NEW JERSEY DIVISION.

When laid	1873.	1874.	1875.	1876.	1877.	1878.	Total.
Tons laid	2013.75	2756.10	4349.	3808.73	1165.90	2011.15	16637.63
Removed in 1873	1.30	...	...	...	...	...	1.30
" 1874	6.55	2.90	...	...	...	...	9.45
" 1875	3.95	3.60	...	...	...	...	7.55
" 1876	1.25	0.57	2.40	...	...	...	4.22
" 1877	2.80	1.45	2.85	0.30	0.83	...	7.63
" 1878	0.30	0.34	0.57	...	...	...	1.21
Total tons removed	16.95	8.86	5.82	0.30	0.83	...	31.98
Per cent. removed	.00797	.00321	.00134	.00008	.00033	...	.00195

Average life of worn-out rails, 1.64 years.

TABLE 4.—STATEMENT OF FOREIGN STEEL RAILS, LAID ON THE PENNSYLVANIA RAILROAD, WEST OF PHILADELPHIA.

When laid	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	Total.
Number of tons	157.	375.	1579.	4058.	2945.	1808.	1008.	2658.	14582.
Removed in 1871	...	0.67	4.76	1.37	6.67	1.25	...	...	14.52
" 1872	14.59	4.15	21.63	...	...	...	40.37
" 1873	3.50	18.37	10.45	5.91	1.70	...	40.94
" 1874	62.28	6.67	...	...	...	68.95
" 1875	132.88	49.46	44.83	65.76	...	...	282.93
" 1876	23.65	14.98	567.01	49.68	28.00	682.66
" 1877	7.44	531.04	175.54	0.58	662.33
" 1878	0.30	23.89	40.62	3.22	34.00	106.31
Total tons removed	...	0.67	176.09	630.31	670.83	661.01	200.38	33.48	2372.71
Per cent removed	...	0.13	11.15	15.53	22.77	36.67	19.87	1.22	16.27

Average life of worn-out rails, 7.77 years.

tion that while such legislation as that in question may be a judicious aid to the common law on the subject of trade-marks, and may be within the competency of legislatures whose general powers embrace that class of subjects, it is not authorized by the constitutional provision concerning authors and inventors and their writings and discoveries.

The other clause of the Constitution relied on to support this legislation is the third of the same section, which provides that Congress shall have power "to regulate commerce with foreign nations, and among the several States and with the Indian tribes." The argument is that the trade-mark is used to identify a particular class or quality of goods, and that as so used it is a valuable aid or instrument of commerce, and so comes within the scope of the constitutional provision cited. With regard to this point the court observes: 1st, That the clause quoted does not bring within the control of Congress every species of property which is the subject of commerce or which is used in commerce ("Wallace vs. Louisiana," 8 How. 73; "Paul vs. Virginia," 8 Wall. 168); and 2d, That the legislation now in question does not limit the use of trade-marks to interstate or international commerce, as it should do if it be based on the constitutional provision now quoted in its support. If it refers to all trade and to commerce between all points, it is obviously the exercise of power not conferred upon Congress.

That this is the purpose of this legislation seems, in the opinion of the court, to be evident. It contemplates the establishment of a universal system of trade-mark registration for the benefit of all who have already used a trade-mark, or who wish to adopt one in future, without regard to the character of the trade to which it is to be applied, or to the locality of the owner. Such legislation is, in the opinion of this court, in excess of Congressional power. It has been argued that, if Congress have power to regulate trade-marks used in commerce with other nations and among the several States, its legislation, so far as it relates to that class of cases, should be held valid; but to this the court holds there are two objections: First, that there is nothing to show that the trade-marks in the three cases now under consideration were used in that kind of commerce; and, second, that it is not within the judicial province to give the words used by Congress a narrower meaning than they are manifestly intended to bear. The court wishes, however, to be understood as leaving the whole question of

the treaty-making power of the general government over trade-marks, and the duty of Congress to pass any laws necessary to carry such treaties into effect, untouched. The question in each of these cases, viz.: Whether these statutes can be upheld in whole or in part as valid and constitutional, must be answered in the negative, and it will be so certified to the circuit courts.—*Opinion by Justice Miller.*

Under the provisions of the Federal Trade Mark law which the Supreme Court has pronounced unconstitutional, about 8000 trade-marks have been registered at the Patent Office, and about 200 applications for registry are now pending.

Testing the East River Bridge Cables.

—People who cross to and from Brooklyn by ferry are apt to look up at the great East River bridge and wonder what assurances they have that when the heavy floor is built and loaded with travel it will be safely held up by the suspending cables. These cables have just been tested by a machine which is the most elaborate and perfect of its kind in the world. It is the one planted on the government grounds at the Watertown (Mass.) Arsenal, designed by Mr. A. H. Emery, and is, indeed, a marvel of skilled construction, for it shows how many ounces are needed to break a piece of thread, and how many tons to fracture a steel beam. The apparatus is microscopic in accuracy, inasmuch that it registers, in a breaking weight of a million pounds, within one pound of the mass needed. This was the machine selected to test the suspending cables, and Messrs. William H. Payne and Isaac Newton, engineers connected with the Brooklyn Bridge, recently spent four days in the tests at the Arsenal, which is under charge of Col. T. T. S. Laidley, of the Ordnance Corps. Instead of using small sections of the suspending cables, they took lengths that would make the results decisive. Not to go into technicalities, the tests were entirely satisfactory, and showed that the precautions taken in putting together the parts were ample for their purpose. The suspending cables were found by the engineers to possess a strength much greater than is required to resist the strain that will be put upon them in actual use. A thought suggested by this test is that it is a matter of regret that a machine so useful should be left on one side of the central lines of iron and steel construction. It cost the government nearly \$100,000, and it would be well to have it used freely by the people.

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Nov. 18, 1879:

Hardware.	Perkins & Co.
Barman Bros.	Scrap, tons, 5
Anchor & chains, a lot	Perkins, Livingston & Co.
Old wire rope, a lot	Spiegelstein, tons, 150
Baker Hermann & Co.	Phelps, Dodge & Co.
Hdw., cs., 22	Sheet iron, bbls., 486
Hdw., cs., 103	Pierion & Co.
Briggs M. & Co.	Bars, 468
Coal, tons, 427	Fish plates, 1248
Brown Wm.	Rails, 1124
Grindstones, 25	Hoop iron, bbls., 126
Degraw, Aymer & Co.	Bar iron, bbls., 666
Chains, cs., 8	Wheeler E. S. & Co.
Folsom H. & D.	Bars, 504
Midse., pkgs., 10	Coils, 394
Friedman & Lauterjung.	Whitney A. R.
Midse., pkgs., 5	Bars, 257
Graef Cutlery Co.	Williamson Jas. & Co.
Midse., pkgs., 4	Pig, tons, 200
Hall W. C. J.	Wolff R. H. & Co.
Machinery, cs., 3	Rod iron, lots, 287
Herrmann H. & Co.	Order.
Midse., pkgs., 3	Bar iron, bbls., 200
Hoe R. & Co.	Bars, 974
Midse., pkgs., 2	Bundles, 1207
Johnston Bros.	Gal'd sheets, bbls., 375
Gas cylinder, cs., 1	Hoop iron, bbls., 473
Lichtenberg Chas.	Old iron, a lot
Hdw., cs., 1	Old iron, tons, 11
Mason J. W. & Co.	Old rails, kllons, 1,539,980
Wire rope, coils, 5	Old rails, pon., 4994
Mitchell, Vance & Co.	Old rails, tons, 1578 1/2
Midse., pkgs., 5	Old railway iron, tons, 800
Mullholland & Hickox	Ore, tons, 1700
Mach'y, cs., 8	Pig, csks., 201
Perkins & Co.	Pig, tons, 4532
Round cannon coal, tons, 105	Rails, 1205
Rogers Henry.	Rod iron, bbls., 1505
Midse., pkgs., 6	Scrap, bbls., 51
Saxton & Seabury.	Scrap, cs., 240
Mach'y, cs., 5	Scrap, kllons, 509,998
Mach'y, pkgs., 3	Scrap, tons, 764
Scholverling, Daily & Gales	Sheet iron, bbls., 2202
Midse., pkgs., 2	Sheet iron, pkgs., 1250
Schuyler, Hartley & Graham.	Sheets, 675
Midse., pkgs., 6	Slab, bars, 33
Sellers W. B. Jr.	Slab, bbls., 34
Midse., pkgs., 3	Spiegelstein, tons, 842
Struller, Lau & Co.	Steel.
Copper caps, cs., 34	Brown Wm.
Tillotson L. G.	Bundles, 105
Tel. wire, lots, 328	Cases, 3
Wieland & Hilder Hdw. Co.	Cary & Moon.
Cutlery, hdw., anvils and razor hones, pkgs., 465	Steel wire rods, bbls., 24
Wolff, H. & Co.	Merchants Dispatch Co.
Midse., pkgs., 3	Steel plates, 51
Wolff R. H. & Co.	Prosser Thos. & Sons.
Order.	Midse., pkgs., 68
Chain, csks., 30	Woodford, W. O.
Coal, tons, 247	Bundles, 508
Emerystone, tons, 974	Order.
Piles, csks., 5	Bars, 11
Guns and gun furniture, pkgs., 20	Bundles, 567
Gun caps, cs., 20	Casks, 10
Hdw., bales, 11	Old railway tires, tons, 500
Hdw., bbls., 55	Spring steel, bbls., 138
Hdw., cs., 1	Spring steel, tons, 445 1/2
Machinery, cs., 1	Steel rods, bbls., 305

COAL.

The warm weather of the past week has had its effect upon the Coal trade, and we find less activity in the market this week than last. It would seem that in many instances the dealers out of town had laid in their winter supply and were not in the market at present. The retail dealers in and about the city complain much of the dullness of trade. In the wholesale trade we find that all are busy filling orders, and would continue so for some time to come, even though there should be no present market. The demand is mostly on the domestic sizes, as it has been for some weeks past. All the manufacturing Coals are quoted as dull, even Lehigh Lump is rather slow of sale. This is natural, as the manufacturers have very generally laid in their winter's supplies. Prices, according to the circulars, have advanced, but we find that actual prices do not seem to sustain this idea. Nominally we have:

Per ton.	Per ton.
Lump, Steamer & Co.	Stove..... \$3.75
Grate Coal..... \$3.15	Chester..... 3.60
Egg..... 3.20	

In the market we find that there is really no quotations for Lump, though Lehigh is nominally \$4. For Broken and Egg it is not certain that \$3 could be obtained, while Stove may be quoted at \$3.75 for Lehigh and \$3.65 for Lackawanna; Chestnut, \$3.50. These latter prices are what the dealers are

asking and getting. Lackawanna Egg is \$3, and Broken, \$2.90.

Sound freights have fallen a little, and we quote New Haven, 90¢. The harbor freights are more reasonable, 35¢ being the present quotation. Boston is quoted at \$1.60 @ \$1.65; Portland, Me., \$1.50 and discharged; Providence, \$1.10.

OLD METALS, PAPER STOCK, &c.

No quotable change in prices has occurred in the Old Metal market since our last review. Rag and Paper Stock is in good demand and the market is firm as quoted.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy.....	per lb. \$0.13 @ .14
Copper Bottoms.....	.. 12 1/2 @ ..
Yellow Metal.....	.. .08 @ .08 1/2
Brass, heavy.....	.. .07 1/2 @ .08
Brass, light.....	.. .07 @ .07 1/2
Composition, heavy.....	.. .11 @ .12
Lead, solid.....	.. .04 @ .04 1/2
Tea Lead.....	.. .03 1/2 @ .03 3/4
Zinc.....	.. .03 1/2 @ .03 3/4
Pewter, No. 1.....	.. .11 @ ..
Pewter, No. 2.....	.. .07 @ .08
Wrought Iron.....	pr. cwt. .00 @ ..
Light do.....	.. .00 @ ..
Stove Plate.....	.. .30 @ ..
Machinery do.....	.. .60 @ ..

The prices current for Rags, &c., are as follows:

Cans, Linen.....	per lb. 3 1/2 @ ..
White Cotton, New.....	.. 4 1/2 @ ..
White, No. 1.....	.. 4 1/2 @ ..
White, No. 2.....	.. 4 1/2 @ ..
White, No. 3.....	.. 4 1/2 @ ..
White, No. 4.....	.. 4 1/2 @ ..
White, No. 5.....	.. 4 1/2 @ ..
White, No. 6.....	.. 4 1/2 @ ..
White, No. 7.....	.. 4 1/2 @ ..
White, No. 8.....	.. 4 1/2 @ ..
White, No. 9.....	.. 4 1/2 @ ..
White, No. 10.....	.. 4 1/2 @ ..
White, No. 11.....	.. 4 1/2 @ ..
White, No. 12.....	.. 4 1/2 @ ..
White, No. 13.....	.. 4 1/2 @ ..
White, No. 14.....	.. 4 1/2 @ ..
White, No. 15.....	.. 4 1/2 @ ..
White, No. 16.....	.. 4 1/2 @ ..
White, No. 17.....	.. 4 1/2 @ ..
White, No. 18.....	.. 4 1/2 @ ..
White, No. 19.....	.. 4 1/2 @ ..
White, No. 20.....	.. 4 1/2 @ ..
White, No. 21.....	.. 4 1/2 @ ..
White, No. 22.....	.. 4 1/2 @ ..
White, No. 23.....	.. 4 1/2 @ ..
White, No. 24.....	.. 4 1/2 @ ..
White, No. 25.....	.. 4 1/2 @ ..
White, No. 26.....	.. 4 1/2 @ ..
White, No. 27.....	.. 4 1/2 @ ..
White, No. 28.....	.. 4 1/2 @ ..
White, No. 29.....	.. 4 1/2 @ ..
White, No. 30.....	.. 4 1/2 @ ..
White, No. 31.....	.. 4 1/2 @ ..
White, No. 32.....	.. 4 1/2 @ ..
White, No. 33.....	.. 4 1/2 @ ..
White, No. 34.....	.. 4 1/2 @ ..
White, No. 35.....	.. 4 1/2 @ ..
White, No. 36.....	.. 4 1/2 @ ..
White, No. 37.....	.. 4 1/2 @ ..
White, No. 38.....	.. 4 1/2 @ ..
White, No. 39.....	.. 4 1/2 @ ..
White, No. 40.....	.. 4 1/2 @ ..
White, No. 41.....	.. 4 1/2 @ ..
White, No. 42.....	.. 4 1/2 @ ..
White, No. 43.....	.. 4 1/2 @ ..
White, No. 44.....	.. 4 1/2 @ ..
White, No. 45.....	.. 4 1/2 @ ..
White, No. 46.....	.. 4 1/2 @ ..
White, No. 47.....	.. 4 1/2 @ ..
White, No. 48.....	.. 4 1/2 @ ..
White, No. 49.....	.. 4 1/2 @ ..
White, No. 50.....	.. 4 1/2 @ ..

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St. PHILADELPHIA, November 19, 1879.

The general outlook of business continues exceedingly favorable, and instead of the falling off in activity usual at this season, we find in many instances evidences of a fresh revival. This is particularly the case in every department pertaining to railway supplies, rail mills, locomotive building, railway tools, &c. At the Baldwin Locomotive Works nearly 2500 men are employed, many departments making overtime, with large orders on hand, and applications for new work coming in daily. The large engineering and machine tool establishments have work on hand sufficient to carry them well into spring, with every indication of additional business at an early date. All the firms engaged in the file trade are far behind with orders, and in the saw trade, instead of the usual falling off at this season, we are informed by the Messrs. Dison that they have been compelled to enlarge their capacity, and are still pushed to meet the demand.

The Enterprise Manufacturing Company, which only a year ago enlarged their premises at a cost of about \$25,000, now find it necessary to expend three times that amount in a further addition. In other directions we find evidences of a similar character, from which it may be safely inferred that there will be a steady business during the winter, with indications of great activity toward spring.

Pig Iron.—There has been no change of importance during the week, although in some quarters the market is reported easier and lower, especially on Foundry Iron. There is certainly a good deal of irregularity in prices, and it is a difficult matter to report the market correctly. The introduction of various grades of foreign Iron new to the market, and from furnaces also comparatively unknown, makes such a confusion that it is almost impossible to determine what the market value really is. As a rule, we find standard brands of Mill Irons in light supply and commanding ready sale at about last week's prices. Foundry Irons, as we said before, are more difficult to move, and, with some appearance of an accumulation of stock, prices are weak and irregular. Several thousand tons were pressed for cash sale last week, and were placed at a reduction of about 3¢ per ton from the regular quotation, which, considering all the circumstances, shows a fair basis of strength. Since these lots have been disposed of there is a somewhat steadier feeling, and there are numerous buyers at better prices than the above, although there is no doubt that Foundry Irons are weak, as compared with other descriptions. Sales of Mottled Iron are reported at \$26.50; Gray Forge, \$27.50 @ \$28; No. 2 Foundry, \$25 @ \$28; No. 1, \$26.50 @ \$30. A fair average quotation of the latter would be \$28 @ \$29.50. Anything above or below these figures is exceptional, although sales have been made at extreme figures both ways. Scotch Iron is steady and in light supply. Eglington offered at \$27, with sales at that figure for small lots. No. 2 Marietta Furnace was put in blast last week, and is turning out a superior quality of Foundry Irons. Watts & Co., Philadelphia, have been appointed sales agents.

Muck Bars.—There is a steady demand for Muck Bars, and sales during the week have been at \$48, at mill. Lots made from foreign Iron are offered at lower prices, but we have not heard of actual sales. We quote the market steady at \$48 for best qualities.

Blooms.—There is a good deal of irregularity in prices, and although lots in a small way are sold at the following quotations, considerably higher prices are realized for superior qualities. The following are minimum rates, and from \$2.50 to \$5 per ton additional is obtained by some makers. We quote: Sunk Scrap Blooms (2464 lb.), \$50 @ \$52; Northern Ore Blooms (2240 lb.), \$47 @ \$49; best quality Charcoal Billets (2240 lb.), for wire and steel purposes, \$75 @ \$80; Bars, \$80 @ \$82.50; Sheet Iron Blooms, cornered (2464 lb.), \$70 @ \$75; Cold-blast Charcoal Plate Blooms, \$70 @ \$72.50; run-out Anthracite, \$62.50 @ \$65.

Structural Iron.—There is no change in the general condition of business; manufacturers have plenty of work on hand, and the

outlook is considered satisfactory. There is a fair demand for small lots for immediate delivery, and prospects of heavy contracts coming on the market soon. Prices are steady, although for desirable orders it is likely that concessions could be obtained. We quote: Angles, 3.6¢ @ 3.7¢; Beams, 4¢; Channels and Tees, 4.2¢.

Plate and Tank Iron.—We have to repeat the same old story, that the mills are full of work, and at present are not in a position to accept orders. In sympathy with most other departments, however, there is an easier feeling, and it is likely that the advancing tendency has been checked for the present. Buyers are less urgent, and sales have been at the following rates, viz.: Tank, 4¢; C. No. 1, 4 1/4¢; C. H. No. 1 Shell, 4.5¢; Flange, 5.5¢; Solid Fire-box, 6.5¢; Best Bloom, 7¢.

Sheet Iron.—Manufacturers report a falling off in the demand usual to this season of the year. They are bare of stock, however, and in a few instances have orders on hand to employ them for some time to come. The season has been unusually satisfactory both as regards the amount of business done and prices realized, although many orders were taken early in the season at very low figures. Prices are rather easier, but for small lots the following are the usual asking rates: Common Sheet, No. 20 to 23, 5.4¢ @ 5.6¢; No. 24 to 28, 5.7¢; Best Refined Sheet, No. 25 to 28, 5.7¢ @ 6¢; No. 16 to 24, 5.7¢ @ 5.8¢; No. 25 to 28, 5.8¢ @ 5.9¢; Refined Plates or Blue Annealed, 5.1¢ to 16, 4.4¢; 17 to 19, 4.5¢; Best Bloom, 26 to 28, 7.5¢; 16 to 24, 7¢ @ 7.1¢; Best Bloom, 7.3¢. A Patent Planished, 11¢; B Patent Planished, 10¢; Best Blooms, Galvanized, 10 % discount, second quality, 20 %.

Bar Iron.—The demand is fair, but as some of the mills have reduced their orders considerably, there is more disposition to secure new business. We have not heard of anything being taken below 3¢, but it is easier to place orders at this figure than it was a week or two ago. Prospects are entirely satisfactory for the Bar trade, although, as usual at this season, business may be quiet for some weeks to come. The demand for Bars cannot fall off to any extent, and, although production is large, there is little doubt that it can be readily absorbed. We quote 3¢ @ 3.2¢ for Best Refined Bars.

Steel Rails.—The market is steady and without change in prices. Business during the week has not been important, several of the leading manufacturers being unwilling to quote prices until orders on hand are reduced. There is a good demand, and prospects of a steady market for some time to come. Prices may be quoted \$60 @ \$65, according to location of mill, section of rail, &c.

Steel Blooms.—Inquiries are quite numerous, but the price now quoted, business is restricted. A sale of an additional 5000 tons was made a few days ago at about \$46, at which figure other lots could easily be placed, but are held at higher prices, say \$48 @ \$49.

Iron Rails.—There is an active demand for small lots, but at the high figures now quoted, sales in quantity are not easily effected. The mills are full of work, however, and can afford to decline orders for some time to come, so that there is no immediate ground for anticipating lower prices, while there is a possibility of an advance in case the demand for delivery in the early spring becomes very urgent. Meantime heavy sections are quoted \$51 @ \$52.50 at mill; light sections, \$54 @ \$56.

Old Rails.—Prices have been steadily maintained, although the market has been neglected for some time past. Consumers appear to be getting through with their stock, and there are decided evidences of a desire to purchase for delivery early in the coming year. We have not heard of any large lots changing hands, although \$31 @ \$31.50 to arrive is freely bid. Small lots on the spot have been placed at \$31.50 @ \$32.50, but the demand for futures seems to indicate that the above quotations are a safe basis to work upon.

Scrap Iron.—Is quiet, but unchanged; Cast at \$22 @ \$24; Wrought, \$34 @ \$36.

Nails.—Demand rather light, but prices steady at \$3.60; stocks small.

PITTSBURGH.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., Nov. 18, 1879.

The great and important event of the week was the resumption of navigation in the Ohio River. There was a freshet in July, but with that exception, there has been very little navigation since the early part of the summer. The resumption, as might be expected, is a source of great comfort to our Coal men, who had commenced to despair, being apprehensive that there might be an ice embargo before they got their Coal on, and it will certainly cause great rejoicing at Louisville and other down river towns, and Cincinnati, where the stock of Coal was almost exhausted, and was commanding fancy prices. Moreover, the opening up of river navigation is a matter of great importance to manufacturers, not only here in Pittsburgh, but at Wheeling, Iron-ton, Pomeroy, and many other points; at Wheeling there are a great many Nails that have been awaiting transportation by river for several months, and then there is pig, salt, cooperage and many other articles, the product of the Ohio Valley, that have been waiting an outlet by river. There are many points that have no railroad facilities. Then, another important fact to note in this connection is that the cost of transportation by river is so much cheaper than by rail; to illustrate this it is only necessary to state that the cost of sending Coal to Cincinnati by rail is 17¢ @ 18¢ per bushel; whereas it can be shipped by river at 2¢, and has been shipped there as low as 1¢. The long suspension of navigation has aroused people more fully to the importance of river improvement, and no doubt the next Congress will be asked for larger appropriations.

Pig Iron.—While here and west of Pittsburgh the market is firm, with no disposition on the part of producers to make any concessions, the weakness and depression in

the East has caused increased offerings from that section. We have heard of two or three offers to sell on the part of producers in the Anthracite region, and at figures from \$1 @ \$2 per ton under what similar Iron can be obtained for in the West. The market here in Pittsburgh appears to be more active than at any other place in the country, and good brands continue to command full prices; moreover, it is worthy of mention that there is no difficulty in selling for future delivery. Some of the mills have bought up until next May and June; this indicates that there is no lack of confidence on the part of Pittsburgh Iron men in regard to the future. A couple of months ago there was no trouble in selling for immediate delivery, but buyers did not care to contract very far ahead. Now, as already intimated, there appears to be more inquiry for future than present delivery. The sale of the old McKnight mill shows the very decided change that has taken place in the Iron business; it was sold last Wednesday for almost double what it was offered at, on long payments, a year ago, and, what is equally as important is the fact that it was purchased by parties who are thoroughly familiar with the Iron business. In regard to imported Iron there has been nothing particularly important developed; while it is admitted that there are some good brands, there is a general antipathy against them, and some of the tests made have not turned out satisfactorily. There is no question, however, but these imported Irons are having their effect upon the market, and it is freely admitted that had it not been for the large importations, American Pig Iron to-day would be bringing \$10 to \$15 per ton more than it is now commanding. Sales reported in lots of 2200 tons of Bituminous Coal-Smelted from Lake Superior Ores, \$30.50, cash, @ \$32.40, for Forge, and \$35, cash, for No. 1 Bessemer; 6400 tons Anthracite, \$29 @ \$30, cash, for Neutral Forge; \$32.50, 4 mos., for Extra Red-short do.; \$27.50, cash, for White, and \$29 @ \$32 for Foundry; 1100 tons Coke, from native ores, at \$30.50 @ \$31.40, for Mill, and \$31, cash, @ \$31.40, for Foundry. There is very little doing in Charcoal Irons; the stock here is light, but there does not appear to be much inquiry for them.

Manufactured Iron.—While orders are not coming forward as freely as they did a few weeks ago, business continues much better than it usually is at this season of the year, as the mills generally have about enough orders booked now to absorb their product until the close of the year. There is reason to believe that the volume of business during the last half of the present year will exceed that of any corresponding period since the panic, if not in the history of the Iron business of Pittsburgh, as every mill, excepting the old Eagle, formerly operated by Mullen & Maloney, and that of the old Pittsburgh Bolt Co., both of which are in litigation, have been working during the time in question to their utmost capacity. While, as already stated, business has commenced to ease up. The outlook is very encouraging for an active business as soon as the spring trade opens. The trade here generally expects that the demand for Iron in 1880 will be the largest known in the history of this country, as in addition to the fact that the consumption for all purposes will be very large, the quantity required for building new railroads will be simply enormous, as a great many are contemplated; and then, in addition, the old companies will be large buyers, as they are all making improvements and replacing the old rolling stock, which will require them to buy a great deal of Iron. Prices steady as quoted for some time past: Well-assorted orders, 3¢, 60 days, for Bars; Sheet Iron, 4.5¢ for No. 24; Skelp Iron, 3.5¢ @ 3.6¢; Plate Iron, 3.8¢ @ 4¢; Hoop Iron, 3.9¢ @ 4¢.

Nails.—There is only a moderate business, but this is nearly always the dull season and it is not likely that there will be any decided improvement until about the middle of January, when orders for the spring trade commence to come forward. Prices unchanged—\$3.65, 60 days, 2¢ off for cash, with the usual abatement of 10¢ per keg on lots of 200 kegs and upward. The resumption of navigation will enable the Wheeling manufacturers to fill some large orders which they were obliged to hold back waiting for a rise in the river. There is every indication of a very large business next spring, and stocks in first hands are very much reduced—some have none.

Horse and Mule Shoes.—The market continues quiet and prices remain unchanged; 100-keg lots, \$4 @ \$5, cash.

Railway Spikes.—There is a fair business for the season, but no change in prices, 3 1/4¢ @ 3 1/2¢ per lb., 30 days—the outside figure for job lots.

Muck Bar.—There is a continued steady demand, and prices are well maintained in sympathy with Pig Iron, \$50 @ \$52, cash, according to quality.

Rails.—So far as we know there have been no recent sales of Steel Rails, in the absence of which we quote nominally at \$62 @ \$65, cash, deliverable on cars at works. The last sale of Old Rail Rails reported was at \$36—may be quoted at \$36 @ \$38. The resumption of navigation will, no doubt, bring some odd lots forward that have been kept back by low water.

Steel.—The demand keeps up well. Mills are all busy, and prices are well maintained. The largely increased consumption within the past few years may be attributed largely to the decreased cost of production, causing it by its cheapness to take the place of other metals. It was apprehended a year ago, in view of the increased capacity, that the Steel business would be overdone, but the consumption has steadily kept pace with the increased production.

Ores.—The resumption of navigation will enable considerable Iron Mountain Ore to reach its destination. The most of that mined and loaded is consigned to furnaces at various points along the Ohio River, mostly above Cincinnati. The arrivals of Lake Superior Ore continue light, and it will not be long now until lake navigation closes. It is very evident that standard Ores are destined to be scarce this winter, and that prices will rule high in consequence.

Wrought Iron Pipe.—While the mills are all oversold, the demand is falling off, as it always does at this time, and the tone of the market is not as strong as it was a week ago, although prices are still maintained. We continue to quote discount on Gas and Steam Pipe at 25 %; on Boiler Tubes, 10 %; Oil Well Casing, 80¢, net; do. Tubing, 25¢, net.

Scrap.—There is a continued fair business, and with limited receipts and light stocks, prices are steady: No. 1 Wrought Scrap, \$40 @ \$42, net; Boiler Scrap, net, \$40 @ \$42; Car Axles, \$55; Car Springs, \$35; Wrought Turnings, \$25; Old Car Springs, gross, \$33 @ \$35; Old Car Metal, \$26 @ \$28; Cast Boring, \$16 @ \$17.

Window Glass.—There is considerable inquiry, notwithstanding this is always the dull season, and with no stock and the cost of production increasing, prices are firm and tending upward. Scarcely a manufacturer is able to fill anything of a large-sized order for immediate delivery, for want of an assortment. Discounts are still quoted at 60 to 60 and 5 per cent. There is every indication of a big spring trade.

Coke.—The market continues firm, and, with considerable inquiry and light stocks, prices are still tending upward; manufacturers expect to realize higher prices in sympathy with the recent increased cost of production. We continue to quote at \$1.50 @ \$1.60 per ton, delivered free on cars at ovens.

Coal.—The long-looked and much-hoped for Coal-boat rise has come at last, and our Coal men are feeling a good deal better. Some 8,000,000 bushels were started down the river during Sunday and Monday, and there are yet remaining some 10,000,000 or 12,000,000 bushels, which it is hoped will be got out before the cold weather sets in and navigation is crippled or suspended by ice.

Petroleum.—Contrary to general expectation there has been considerable of a boom in Crude Petroleum within the past few days; an advance of 20 to 25 cents per barrel has been established, and business, mainly of a speculative character, largely increased. On Monday \$1.20 was touched for United Certificates, equal to \$1.25 for shipment—the highest obtained for a long time. There is not much confidence in the immediate future of the market. As the production continues large the consumption is likely to fall off between now and the close of the year, and the improved prices will tend to stimulate development. It is thought, however, by many well-informed operators that prices will be considerably higher next year unless some new territory is opened up.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts., CHATTANOOGA, Nov. 17, 1879.

The outlook is for comparatively quiet business in all lines during the remaining months of this year. Manufacturers will not be so crowded with orders as has been the case with them during August, September and part of October. Neither will they be under the necessity of ignoring stated quotations, selling only at rates made from day to day. Prices have become comparatively settled, with a tendency to heaviness in the market. Some articles would have to be shaded slightly to effect considerable transactions in them. The weather during the week has been summer-like, ending with considerable rains, and clearing off as warm as before.

Pig Iron.—About the usual business has been done. All grades are fairly strong, though concessions of a point or two would be necessary to effect sales of large lots of Forge Irons. We make no change in last week's figures. We quote Coke Mill at \$1 @ \$2 lower. The tone of the market is steady and healthy. We continue last week's prices. Coke Irons—No. 1 Foundry, \$28 @ \$33; No. 2, \$25 @ \$28; Gray Forge, \$28 @ \$30; White and Mottled, \$25. Hot-blast Charcoal—No. 1 Foundry, \$28 @ \$33; No. 2 ditto, \$25 @ \$28; Gray Forge, \$27 @ \$28. Cold-blast Charcoal—Car Wheel Metal, \$30 @ \$40.

Muck Bar, &c.—There is no Muck Bar in market, and there will be none made for sale until Old Rails and Wrought Scrap are plentiful. Both the latter are scarce and stiff. Old Rails, \$32 @ \$35; Wrought Scrap, \$28 @ \$33; Old Car Wheels, \$25.

Ores.—Maintain the last quotations, though any considerable fall in Pig would send them down to the old figures. Brown Hematite, 50 to 56 %; per ton, \$2 @ \$2.75. Red Ferriferous, \$2 @ \$2.25, on cars in the city or on the wharf from flat boats.

Nails.—Are in brisk demand. Orders received at mills here on Saturday for 2000 kegs, and that is not an unusual run of orders. We quote at \$3.75.

Manufactured Iron.—The demand continues brisk and prices are well maintained. Bars at \$3.50; Railroad Spikes, \$3.40; Track Bolts, \$4.75; Trestle Bolts, \$5.50.

The great activity has been in Forge Irons. Our quotations continue rather nominal: We quote shipping-port prices of American Pig Iron at \$28 @ \$29 for No. 1 X; \$27 @ \$28 for No. 2 X; and \$27 @ \$28 for Gray Forge. We quote spot lots of Pig Iron at \$31 @ \$32 for No. 1 X; and \$30 for No. 2 X. *Scotch Pig*.—The imports of foreign iron continue large, but there has been a fair movement, and we continue to quote \$27 @ \$28 for Eglington; \$28 @ \$29 for Gartsherrie, and \$29 @ \$30 for Coltness. *Old Rails* have been in better inquiry, and there have been sales of English at \$33.50. It is rumored that Naylor & Co. have bought 30,000 tons of Old Rails abroad. Holders of American Rails at this point are firm at \$36. *Manufactured Iron* is without material change, and 3¢ is still the mill price for ordinary refined, though some dealers at this point who have fair stocks are reported to have sold at lower figures. Plate and Sheet Iron show no change. Copper has stiffened somewhat, and closes strong at 21¢ @ 21½¢ for Ingots. We quote store lots 22¢ @ 23¢. Manufactures are without material change, and we continue to quote: Copper Sheathing at 28¢; Braziers at 30¢; Bolts, 30¢; Bottoms, 35¢; American Yellow Metal Sheathing, 17¢ @ 18¢; Yellow Metal Bolts, 20¢; and English do., 13¢ in bond. *Antimony* dull and easier, at 18¢ @ 19¢. Lead is firmer, and we quote 5½¢ for large lots of Pig, and the Boston store price is 5½¢ @ 6¢. Manufactures are higher, quoting Lead Pipe, 7½¢; Tin-lined Pipe, 15¢; Bar Lead, 8¢; Sheet Lead, 8¢; Block Tin Pipe, 40¢; all of these are subject to the usual trade or 10% discount. *Spelter* is unchanged at 6¼¢ @ 6½¢ for car-load lots, and 6¼¢ @ 6½¢ for Boston store price. *Sheet Zinc* firm, quoting the Boston store price 9¢. Tin has continued quiet, and Straits are nominal at 23½¢; Banca at 27¢, and English L. & F. at 22½¢ @ 23¢. Tin Plates continue in good inquiry at unchanged prices, quoting \$7.50 @ \$8 for Charcoal I. C.; \$7.50 @ \$8 for Coke I. C.; and Charcoal Terns at \$9.75 for M. F., and \$7.75 for ordinary do.—*Commercial Bulletin*.

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of Nov. 17, write as follows: The market has manifested considerable activity in Coke and Stonecoal grades, and in Malleable and Car-Wheel Irons. Some large sales of Bessemer have also been closed, making in the aggregate a very satisfactory week's business. Charcoal Hot-blast Irons appear to be a little neglected, the movement, while fair, not being in proportion to that of other grades, while the tonnage is not as heavy as it was during the excitement prevalent while the market was rapidly advancing from the unprecedented low figure reached last fall; still, a heavier business is being done in a quiet way than for many years at this particular season, it being usually a period of comparative dullness prior to winding up the year's business, and indications favor a very large business in all Irons the coming year. Many furnaces are confident of higher prices being reached than any yet current. Two most important points bearing on the future of the market that are frequently overlooked are the large increase in population during the past few years, and the fact that, no matter what price Iron commands, it is practically impossible to have all the furnaces in blast at one time, 75 per cent. being about the outside limit. Since the recent advance a large number of the furnaces tributary to this market have had to largely reduce or entirely suspend production for varying periods from causes over which they had no control, and which are always more or less incident to the smelting process. We note the advance of Steel Rails to \$65. Iron Rails have sold here at \$60; sellers are now holding at \$5 higher.

HOT-BLAST FOUNDRY.

Hanging Rock C. C. No. 1.....\$35.00 @ 42.00
Southern C. C. No. 2.....38.00 @ 39.00
Strong Neutral Coke.....36.00 @ 37.00
Fannie, American Scotch.....35.00 @ 36.00
Hocking Valley S. C.....37.00 @ 38.00
Hanging Rock, S. C.....35.00 @ 36.00
Open Silver Gray.....38.00 @ 39.00

FORGE IRONS.

Hanging Rock, C. C. Gray Forge.....35.00 @ 36.00
Coke.....35.00 @ 36.00
Cold-Short, Gray Forge.....33.00 @ 34.00

CAR WHEEL AND MALLEABLE.

Hanging Rock.....47.00 @ 50.00
Southern.....43.00 @ 47.00
Lake Superior.....48.00 @ 51.00
Salisbury.....50.00 @ 53.00

LOUISVILLE.

Messrs. G. B. H. HULL & Co., under date of November 17, write us as follows: The views of buyers and sellers are wide apart, and sales are few. We continue to quote on cash basis:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal.....\$39.00 @ 40.00
No. 2.....37.00 @ 38.00
No. 3 Southern, Charcoal.....37.00 @ 38.00
No. 4.....36.00 @ 37.00
No. 1 Hanging Rock, Stonecoal and Coke.....37.00 @ 38.00
No. 2 Hanging Rock, Stonecoal and Coke.....36.00 @ 37.00
No. 3 Southern, Stonecoal and Coke.....37.00 @ 38.00
No. 4.....34.00 @ 35.00
Silver Gray.....32.00 @ 34.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.....35.00 @ 36.00
No. 2 Stonecoal and Coke, Cold-short and Neut'l.....32.00 @ 33.00
No. 3 Stonecoal and Coke, Cold-short and Neut'l.....31.00 @ 32.00
No. 4 Missouri and Indiana Red-short.....34.00 @ 35.00
White and Mottled, Cold-short and Neut'l.....25.00 @ 26.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast.....45.00 @ 50.00
Alabama and Georgia, Cold-blast.....40.00 @ 45.00
Kentucky, Cold-blast.....40.00 @ 45.00

W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, under date of November 17, write as follows: Contrary to expectations, trade for the season continues remarkably active, and the activity is not limited to any one line. As we noted in our last, the easier feeling in Iron continues; there is a greater willingness to sell, though as yet we can bear of no concessions in prices, and all offers are for specifications accompanying

order, and generally for immediate delivery. All of the makers express confidence in higher prices after the 1st of January, but it looks as though the surplus production between this and then may relieve the scarcity which a most active spring trade, under other conditions, would produce. Nails and Hardware are held firm at the advances, and there seems to be no hesitation on the part of buyers in stocking up for their legitimate wants. The Coal famine is at an end, and prices on Pittsburgh Coal have dropped from \$7 to \$4 per ton before a single barge has reached here from above. Kentucky Coal, the production of which was so stimulated by the scarcity that, instead of 40 car loads, 120 are now delivered here daily, has been reduced to \$2.75 per ton. Meanwhile news from Pittsburgh announces a coal-boat rise there and shipment yesterday of 2,500,000 bushels for this point. Altogether, this is the best news we have to report, as it affords the long-desired relief to many of our factories which had shut down for want of fuel.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, Baltimore, report us the following under date of November 17: The business situation remains unchanged, with values firm at unaltered figures.

Ref. Bar Iron, 1 to 6 by ¾ to 1.....\$3 ¼ @ 3 ½
" 1 to 4 by ¾ to 1.....3 ¼ @ 3 ½
" ¾ to 1, Round.....3 ¼ @ 3 ½
" and Square.....3 ¼ @ 3 ½
Hoop Iron, 1½ wide and upward.....3 ¼ @ 4 ½
Band Iron, from 1½ to 4 in. wide.....3 ¼ @ 3 ½
Horse-shoe Iron.....3 ¼ @ 3 ½
Norway Nail Rods.....3 ¼ @ 3 ½
Black Diamond Cast Steel.....12 ½ @ 13 ½
Machinery Steel.....7 @ 8 ½
Cast Spring Steel.....6 @ 8 ½
Homogeneous Steel Plate.....6 ½ @ 7 ½
Common Horse Nails.....10 @ 11 ½
R. R. Spikes, 5½x10-16.....3 ¼ @ 3 ½
Perkins' Horse shoes, ½ keg of 100 lbs.....5-12 ½
Mule shoes.....5-12 ½

Putnam Horse Nails.....10 @ 11 ½
Globe Horse Nails.....10 @ 11 ½
Less list discount to the trade.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows under date of Nov. 17: We have to report a fair demand for Pig Iron, and with the general light stock on hand, prices are well maintained at about the following rates:

Baltimore Charcoal Wheel Iron.....\$35.00 @ 40.00
Virginia.....32.00 @ 33.00
Anthracite No. 1.....29.00 @ 30.00
" No. 2.....28.00 @ 29.00
" No. 3.....27.00 @ 28.00
" Mottled and White.....25.00 @ 26.00
Charcoal, C. B. Blooms.....75.00 @ 80.00
Refined Blooms.....60.00 @ 65.00

ST. LOUIS.

St. Louis, Mo., Nov. 15, 1879.

Continue quotations of last week. Market is about in same condition, with considerable Iron selling. Car Wheel Irons are strong and scarce, and the tendency is for further advances in price. Ordinary Irons hold their own, and promise better results early next season.

CHARCOAL HOT BLAST.
Missouri.....\$15.00 @ 16.00
Southern.....14.00 @ 15.00
Hanging Rock.....None offering.

COKE AND COAL.
Missouri.....None offering
Southern, No. 1.....32.00 @ 33.00
Ohio River, No. 1.....32.00 @ 33.00
Jackson County, No. 1.....32.00 @ 33.00
Hocking Valley, No. 1.....32.00 @ 33.00
No. 2 and Mill ½ to ¾ per ton less.

COLD BLAST.
Missouri.....35.00 @ 37.00
Southern.....38.00 @ 40.00
Ohio.....40.00 @ 42.00

IRON ORE.
Iron Mountain.....7.50 @ 8.00
Southwest.....7.00 @ 7.50
Ore for flux.....9.00 @ 9.50

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of November 17: Considerable Scotch Iron is arriving, and the market for it is considerably weaker. On the contrary, prime 1 X and 2 X American are stronger, and advance on quotations demanded. There are inquiries for large lots, for the Western markets, of all descriptions of Pig, Old Rails, Wrought Scrap, &c. We continue previous quotations:

American Scotch Pig Iron.....\$29.00 @ 30.00
Anthracite, No. 1.....\$29.00 @ 30.00
" No. 2.....28.00 @ 29.00
" No. 3.....27.00 @ 28.00
" Mottled and White.....25.00 @ 26.00
Coke, No. 1.....29.00 @ 30.00
" No. 2.....28.00 @ 29.00
Va. Warm-blast Charcoal, Cold-short.....32.00 @ 33.00
Cold-blast.....30.00 @ 31.00
Old Rails.....29.00 @ 30.00
Wrought Scrap No. 1.....27.00 @ 28.00
Machinery.....23.00 @ 24.00
Richmond Refined Bar Iron, Stand'd.....3 ¼ @ 3 ½
Horse Shoes, Tredgair.....3 ¼ @ 3 ½
Mule.....3 ¼ @ 3 ½
Old Dominion Nails, (standard size).....3 ¼ @ 3 ½
Freights to New York, \$1.50 for 240 lbs. by rail.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., Nov. 3, 1879.

THE IRON MARKET

presents a more settled, and in some respects, a firmer appearance than at the date of my last report. In the northern districts the spirit of speculation has temporarily retired in disgust, and neither bulls nor bears are enabled to perform their wonted operations with any especial degree of satisfaction to themselves. To the legitimate traders this discomfiture of the wreckers is matter for much congratulation, producers as well as dealers and consumers, having nothing to lose and everything to gain by the fact of business being conducted on a sound and solid basis. The Glasgow market just now presents a decidedly woe-begone spectacle, there being no great amount of spirit among

holders of warrants, quotations for which have rapidly fallen away. Shipping transactions have also begun to show to less advantage, last week's returns being several thousand tons below the figures for the preceding, and other recent like period. In sympathy with this weakness—which largely justifies the warnings and prophecies of the Cassandras of the past two months—the Cleveland and other smelters are becoming more modest in their tones, and are less vehement in their resistance as regards higher figures for "short" deliveries. Something of the kind is also noticeable elsewhere, and in certain allied branches, but with the exception of the two principal northern districts it cannot be truly and honestly stated that even raw irons have receded to any appreciable extent. Contemporaneously it appears to be an undoubted fact that many kinds of manufactured iron have become stiffer and worth more money than they were fetching a fortnight ago. In the absence of any declared official rise, it is necessarily rather difficult to diagnose the state of the market, but making allowances for numerous wild misstatements which have been published by the daily papers, I think it must be admitted that most kinds of merchant and general finished iron are at least 10 per cent dearer, while a few brands of sheets and bars have gone up 20 within the month. In South Staffordshire the action of the Coal Masters' Association—or rather that of Mr. Fisher Smith, agent of the Earl of Dudley, who is said to have forced the hands of his confrères—in raising coal prices 1/ per ton from November 1st, has given rise to the supposition that the "list" houses will immediately follow suit by declaring an advance of at least 10 per cent on marked bars, a step which would cause all other kinds of finished iron to stiffen to the same extent at least. This contingency is possible, perhaps probable, but up to the time of this writing I have heard of no official change in either one or the other direction. As a matter of personal opinion, I incline to the assumption that the leading ironmasters will avoid an official rise as long as possible. At the same time it is not to be denied that the briskness of the rail mills, the revival of the great Clyde shipbuilding industry, and the general increase of purchases, warrant a better feeling; hence the alteration thus foreshadowed may take place a few days hence. In any case its effects will be limited so far as the home trade is in question, although such an announcement might induce tardy buyers elsewhere to close their negotiations prior to any further manifestation of the same kind. Briefly, it is safe to assert that the iron trade of Great Britain is steadily improving, notwithstanding speculation and a rapid augmentation of the production all over the country.

SCOTCH PIG IRON

has fluctuated considerably during the week, but as a whole the market has become feebler, and quotations are lower all round. For the time being the speculators are dispossessed, but it is not improbable that the fall in prices may so stimulate the American demand as to cause a further rise may be brought about, in which case the dabbles in warrants may count upon having another inning. The circular of John E. Swan & Bros. shows that there are now 356,056 tons in the official stores, an increase for the week of 9464 tons, and 157,000 tons over the quantity held a year ago. Shipments for the week ending October 25 were 22,945 tons, of which 15,425 were foreign. The total shows an increase of 14,022 tons over the corresponding week of 1878. To date this year there has been an augmentation of 135,673 tons, and a decrease of imports from Middlesbrough of 29,523 tons. The latter traffic is now on a very limited scale indeed. Ballast pig has dropped 5/ per ton, being now quoted 45/ alongside in the Clyde or Forth. There are 95 Scotch furnaces blowing, against 88 this date last year. Messrs. James Watson & Co. reported on October 31: "The iron market opened firm on Monday morning at 55/1½, advancing to 55/6, but afterward receding rapidly to 54/3 per ton. On Tuesday the price was weaker with a good business from 54/3, 14 days, to 52/3, cash, and on Wednesday the market was irregular, with transactions from 52/3 to 54/4, cash, then back to 53/3 per ton. Yesterday forenoon the market gave way from 53/ @ 52/3 per ton, but improved in the afternoon to 52/10½ per ton, closing at 52/7½ per ton. To-day a large business has been transacted at 52/6, 52/4½, then up to 52/9, cash, closing with buyers at the last named figure. The demand for shipping brands has been dull and prices are consequently lower. The shipments last week were 22,945 tons, as compared with 8023 tons for the corresponding week of 1878." We quote:

G. M. B., at Glasgow.....No. 1.....No. 2.....
Gartsherrie.....56/.....54/6
Coltness.....53/.....51/6
Summerlee.....52/.....50/6
Langloan.....50/.....48/6
Carnarvon.....49/.....47/6
Caldar, at Port Dundas.....50/.....48/6
Glenharroch, at Ardrossan.....51/.....49/6
Eglington.....50/.....48/6
Dalmellington.....49/.....47/6
Shotts at Leith.....48/.....46/6

Shipments of Scotch manufactured iron and machinery were on a large scale, the aggregate value being set down at £87,000, which included £2500 of old rails, &c., for Baltimore.

IN CLEVELAND there is much more work in course of execution than there was a short time ago, and there is in some quarters an impression that prices must go up considerably higher than at present, owing to the circumstance that a large proportion of the ironstone mines are closed and can scarcely be reopened at a moment's notice. This may or may not be the case, but there seems to be little or no reason for doubting that a course of steady trading has been entered upon. The plate mills and foundries are quite well employed. It is stated that the colleagues of Mr. Edward Williams, the president of the Iron and Steel Institute, in his new venture are Messrs. W. Ménélaus and G. T. Clarke, both of Dowlais. It is inferred that those gentlemen will still retain their connection with the famous Welsh establishment. It may interest some of your readers to know that current rates for Cleveland pig iron are as follows:

G. M. B.
No. 1 Foundry.....46/6 Mottled.....40/6
" ".....44/ White.....39/6
" ".....41/6 Kentledge.....46/6
" ".....41/6 Cinder.....41/6
4 Forge.....41/6
All net cash, delivered f. o. b. at makers' wharves in the Tees.

THE NEW MAYORS

to be elected this day week will include Messrs. Richard Chamberlain, at Birmingham, and Mr. Edward Tozer, at Sheffield. Mr. R. Chamberlain is a member of the "screw" manufacturing family, and consequently brother to the well-known radical member of Parliament for the hardware capital. The new Mayor, however, is not in business. Mr. Edward Tozer, the chosen chief citizen of Sheffield for the ensuing year, is, I believe, very well known to many of your readers. He was associated with the management of Sanderson Bros. & Co. for a long time, but has been (and still is) a member of the Bessemer and rail-making concern of Steel, Tozer & Hampton, near Sheffield, for several years past. Mr. Tozer has already been master cutter. At Wolverhampton, Mr. John Jones, of the Wolverhampton Corrugated Iron Company, will again preside over municipal affairs. The new Lord Mayor of London is Sir Francis Truscott. Mr. Imeson will be Mayor of Middlesbrough. The Lord Provost of Glasgow is elected triennially, the office being at present held by Sir W. Collins.

ADVISES FROM ITALY

which have come before me to-day are of considerable interest, as foreshadowing the adoption of a course by the government of that country which may not improbably result in the shutting out of all foreign iron and steel. At present the idea exists only as a *projet d'etat*, but I am informed that so soon as the Italian Parliament meets a measure will be pushed through by the Depretis party, declaring the willingness of the government to grant an absolute concession to any group of capitalists or firm which is willing to develop the mineral resources of Elba, by erecting Bessemer and rail works there. The concession will amount to an absolute prohibition of all imports of railway materials from abroad, and the government will, it is stated, undertake to purchase from the concessionnaires all the rails and other materials required for the huge scheme of new railways about to be carried out under its auspices. I have seen the printed "project" which embodies these rather comprehensive proposals, but I am at present without data which would enable me to precisely determine or gauge the probabilities of the scheme. It is known, however, that political influence is likely to be used to carry out the proposal, which possess a certain fine patriotic flavor which will no doubt, weigh with many Italians. At the present time a somewhat enthusiastic Italian gentleman is in this country seeking the aid of British capitalists in furtherance of the project, but so far as I can learn his success has not been very marked. His idea is that the proposal affords a fine opening for the removal (bodily) of some unprofitable plant from this country to Elba, inasmuch as even now British rails cannot be delivered in Italy in competition with the goods of German makers, who quote £5. 5/ delivered, against the £7. 6/ or so of British manufacturers. Is there anything in the notion worthy of the attention of those on your side who have superfluous capital waiting the opportunity for profitable investment?

THE BALDWIN COMPANY,

of Philadelphia, were defeated, I hear, the other day in a competition for 10 locomotives required by the Alta Italia Railroad Company. The defeat, however, was more a misfortune than a fault, as no drawings or tracings were sent over to your side. The order was secured by a house at Cassel, Germany, at a price which, I hear, was 75 francs per 100 kilos. Only one English firm—that of Stevenson & Co.—entered into the competition.

AMERICAN COAL AND STOVES

are being sold in Italy, Switzerland and elsewhere, not in very large lots, but in quantities which are said to give promise of a larger trade in future. The coal goes as ballast to Venice and other Italian ports, and is stated to be sold at prices which compete favorably with English fuel. It is even sent up into the Tyrol and Bavaria from Venice, especially for use with your stoves, which need coal of a cleanly sort instead of charcoal or coke. I don't think the English coal exporters are as yet quite alive to their best interests in the matter.

AT SHEFFIELD

trade is decidedly improving in the lighter branches as well as in the heavier trades. The Bessemer works are all very busy, not only as regards their rail mills, but also on forgings and rolled descriptions. One house is said to have recently booked an order for 10,000 tons of billets, and to have refused additional commissions. Prices are very steady, and we are not likely to hear of any more orders at £4 per ton, so long as hematite pigs range up to 80/ and spiegel Eisen, &c., are as scarce and dear as at present. Several of the home lines are in the market for rails, which they will have to purchase at a much higher price than was current a couple of months or so ago. I may say, in this connection, that the leading lines of this country are now using a much heavier rail than formerly, bull-headed sections of 80 to 86 lbs. per yard being in vogue on the Midland and other roads where the heavy and express traffic necessitates the laying down and maintenance of an exceptionally solid and firm track. Double-headed rails seem to be out of favor, many engineers having a decided and well-founded objection to the use of turned rails, it being found in practice that the bottom head always gets pitted and rusty where it has rested on the sleepers. The Great Northern, our best passenger road and the fastest line in the world, has now started a Pullman dining-room car between London and Leeds. Should the notion prove successful, the cars will in all probability be run to Scotland, so that all appearances seem to indicate the continued use of very heavy sections of rails, which are absolutely necessary where these heavy cars are used. The London, Brighton and South Coast Company also run Pullman vehicles daily be-

tween London and Brighton. Modified to suit British ideas I think such cars are likely to be in extended use among us a few years hence. Certainly they are better calculated to survive collisions and other varieties of railway smashes than any carriages we have at present. Just now a

NEW USE OF MACHINERY

for sheep-shear making purposes is commanding a great deal of attention at Sheffield, and is not unlikely to excite considerable opposition from the trades unions of that town. The prime mover in the introduction of the new processes is Mr. David Ward, who is at present Mayor and has been the master cutter. Mr. Ward is "Ward & Pavn," the foremost makers of sheep shears in the world, and also a leading edge-tool house. He has on former occasions had severe fights with the trades unions and has always hitherto emerged victorious. His sheepshears meet with the largest demand in South America, the Cape, Australia and New Zealand, and for a long time carried all before them. Latterly, however, Mr. Ward found that the Germans were introducing cheaper shears than his own, which fact has stimulated him to lay down special machinery with intent to cheapen the production. That machinery has now been completed, and the immediate result is the dismissal of a large number of the handworkers. Two men have worked hard to make 15 dozen of shears per week, but the machinery will produce a pair per minute, each pair being said to be fully equal to the hand-forged article. Besides the increased output thus attained, there will be an important reduction in prices amounting to 32½ to 35 per cent, below the English hand-made articles, and 15 per cent. under the lowest quotations for the German shears. Another Sheffield house—J. H. Sorby & Co. ("Lockwood & Co.")—are understood to be following in the wake of Mr. Ward, who is also stated to contemplate the putting down of special grinding machinery, which would still further tend to economize the cost of production. Twenty years ago Mr. Ward would have had his works blown up and his own life threatened in consequence of these innovations, but I think the enlightened public opinion of to-day will repress the zeal of the trades-union gentlemen. On the subject of

FOREIGN HORSE NAILS,

a very pretty controversy is being carried on in the public correspondence pages of the *Ironmonger*. A Lincolnshire clergyman originated it, by stating that he found his horse had been shod with nails which rendered it unnecessary to fasten or replace a shoe for a very long time. The English manufacturers took the matter up, and seized the opportunity thus afforded for belauding their own wares. One firm not only did this, but took occasion to run down certain German horse nails. The German company affected promptly accepted the challenge, and showed that they had been largely supplying their English critics, who had, however, quarreled with them on a question of price. It had also been asserted that the foreign nails were not meeting with any sale worth naming in this country, whereas an ironmonger who signs his letter, states that he has already sold three tons of them and has ordered another ton! The best part of the business, however, is that the German nails are made by an American machine, which hammers them hot from the rod and turns them out pointed ready for use. This is another feather in the cap of your inventors!

FROM BIRMINGHAM

there comes another testimonial as to the increasing popularity of American goods in our antipodean colonies—a matter which is naturally most galling to not a few of the more enterprising British manufacturers. This is evidenced by the following extract from a letter addressed by the London representative of a large Australian house to a leading firm of merchants in Birmingham: "I inclose you the orders from Melbourne to hand this mail. I feel quite grieved to note that the 'American' order consists almost entirely of janned iron goods, planes, carpenters' tools, electro-plated goods, locks, cutlery, &c.—the very items which, seven years ago, were supposed to be almost a Birmingham, or, at least, English monopoly. Are your workmen losing their skill, or your employers their enterprise? Why do not the masters go to the foreign markets en masse and see what America is doing? This utter inactivity in another seven years' time will reduce our importations from England almost to nothing." "I may add," says the Birmingham correspondent of the *Ironmonger*, "that the value of the American goods ordered through this English firm amounted to several thousands of pounds monthly, and that it is growing. The head of the firm, who communicates this extract, writes to me on his own account: 'I am weary of the complaint repeated by every correspondent—'American goods are so much better than English—better made, better finished, better wrapped up, better packed, better marked on packages.' All these charges I know to be true, and made by men whose sympathies are with the old country, and who only buy American goods because they are compelled to do so.' I think we may assume that there will be a change on this side shortly. There are now scores—I may say hundreds—of English representatives in New South Wales for the Sydney Exhibition. These gentlemen will spend many months in that colony, and most of them will move up to Melbourne next year. They will thus obtain an extended practical knowledge of the requirements of the colonial retailers and consumers, and it would be strange if their knowledge were not put to business uses on or prior to their return."

IN STAFFORDSHIRE

the iron trade is decidedly stronger. This morning circulars are to hand announcing advances in coal prices averaging about a shilling per ton. Several iron manufacturers, including such houses as Messrs. Barrows, Baldwins, &c., also intimate that in the present state of the market they feel compelled to withdraw all quotations, a course of action which seems to preface an official rise in finished iron. The merchant houses are protecting themselves by the adoption of similar action. During the

week many kinds of hardware, especially those into the composition of which the superior and scarcer metals enter more or less largely, have become 2½ to 10% dearer. The changes are so numerous that I cannot very well enumerate them in the limited space allotted to me. The action of your Judge Blatchford in granting an injunction against the Guion line, restraining the importation of cotton ties, which are alleged to infringe the patents of your Cotton Tie Supply Association, has excited expressions of surprise here, but we are as yet without definite information showing the precise meaning of the "move."

IN SOUTH WALES AND MONMOUTHSHIRE
trade is steady, and there is a larger output all round. The reopening of Cyfarthfa has been the occasion of much rejoicing at Merthyr, although only two blast furnaces, two mills and a limited number of puddling furnaces have been set going. The first order is an American one for 400 tons of iron rails. Last week's shipments from Cardiff included 1400 tons of rails to Baltimore and 500 tons to New York, while from Newport 800 tons of tin plates went direct to New York. The tin-plate works are all busy and prices are stiffer in consequence of the advices from your market.

THE METAL MARKETS
have fluctuated somewhat, particularly tin, which, after a drop caused by the Cornish smelters lowering standards to the extent of £3 per ton, has again stiffened and is now quoted at close upon £100 per ton in large lots. The price of spelter is also well upheld and there is some talk of a further rise being declared by the Vieille Montagne combination. In antimony prices are steady. Quicksilver is affected by speculation, but is on the average fully 25 per cent. dearer on the month. The last official report of the London Metal Exchange runs thus: Copper firmer; G. O. B. Chill bars, £65. 10/ @ £66 spot, and £66. 10/ forward; Wallaroo, £74; Burma, £71. 10/ @ £72; English tough, £71 @ £72; best selected, £72 @ £74; strong sheets, £77 @ £78. Tin much dearer; business from £91 @ £96 in fine foreign, closing about £95; English ingots, £96 @ £97. Iron.—Scotch pigs, 52/6 @ 52/9, cash. Lead.—£16. 17/6 @ £17. 5/ for English pig; soft Spanish without silver, £16. 13/ @ £16. 17/6. Spelter firm; £19. 5/ @ £19. 10/ for ordinary brands. Quicksilver, £8. 5/ per bottle. Antimony, £63 @ £65 per ton.

FOREIGN.

FRANCE.

(Moniteur des Interests Matériels.)

PARIS, Nov. 2, 1879.—Metals.—Business in general has been moderately active. Copper, although the market has been less brisk, there has again been an improvement of 2.50 francs, and we now quote here: Chill Bars, 172.50 @ 177.50; Ingots and Slabs, 180; Best Selected, 185.50; and pure Corrocor Ore, 175. Manganese has been weak, but unaltered. They quote: Small Refined Ingots, 175; Copper in sheets, 185; Bolts, 200; Yellow Metal Sheathing, 180; and Copper ditto, 120 francs the 100 kilos. Tin.—There has been a quiet state of the market, but a fresh advance of 2.50 francs has, nevertheless, been established. We quote English Common 245, and all other sorts, 250 francs. At Marseilles the metal has been neglected, and a decline of 1 franc on Straits and Banca has been submitted to. Lead.—There is noticeable an active inquiry at 1 franc improvement. We quote the various sorts 41 @ 43 francs here. A large business has been transacted at Marseilles and the market has steadily tended upward. They quote: First Fusion, 41 @ 42; Second ditto, 40; Antimonyous, 38; and Manufactures, 35 @ 36 francs. Spelter.—A rise of 1 franc has taken place, and the market is firm at Paris at 51 francs for Silesian. We quote Sheet Zinc, 65. Manganese is steady. They quote Vieille Montagne 61, and other Sheet Zinc, 60, while Old Refined still sells at 27 francs. Nickel.—The market is quiet at 27 francs. Iron.—Building has slackened somewhat at Paris, but prices have, nevertheless, remained steady. All iron bridge building is in request, and prices for the same are very firm. There has been great steadiness in the Haute-Marne, on the basis of 16 francs for No. 2 Merchant Iron, 51 francs for Polished Chains (Nos. 22 and 23), and 26 francs for Common Nails (No. 18). There have been numerous business proposals made to producers to sell goods to consumers deliverable in all the coming 12 months at current rates, but makers are not anxious to accede to these propositions. Castings are in great demand, and this will soon cause an advance in Pig Iron in that locality. The Longwy Company has raised the price of "moulage" Pig Iron from francs per ton to francs per ton, worth 73 @ 77 francs, according to the size of lot. White "moulage" ditto sells at 55 francs at the works. Prices at Nancy are 70 @ 72 and 53 @ 54. We are assured that Messrs. Schneider & Co., of the Creusot Works, intend buying the Sainte-Claire and Villers-forges at Neuville. Another committee of the forge owners of the Maubeuge and Valenciennes basins is to come off on Nov. 6 next, in the northern department. In the latter the price will probably be raised to 17 francs for Merchant Iron as a basis. Machine Horse Shoes have declined considerably of late in spite of the advance in iron. Although it cannot be said that the Rhone and Loire basin has been inactive, the orders lately dropping in have been unimportant; but in spite of this circumstance producers have undiminished faith in the future. Meanwhile prices have remained stationary, which is perhaps all the better, for if they had been put up consumers would have held back, and there would have been a total interruption. It should, however, be remarked that Sheet Iron is as much wanted as ever, and even more so, especially for iron shipbuilding. This basin has been favored with the job of furnishing the railway material for the Haute-Vienne line. Coal.—There is a good feeling at the North and in the Pas-de-Calais, and prices are firmer, but the companies are now riding themselves of old stocks of inferior coal, and while doing so a general rise is prevented.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Nov. 2, 1879.—Iron.—Iron works in Belgium are very busy, and an extensive business is transacting. Producers do not wish to contract any further ahead than February next for fear of a further advance in raw material and in freights to European ports. Between the two they apprehend having between 12 and 15 francs against them by that time. Puddling furnaces are being blown in; Sheet Iron is in demand, with an immediate upward tendency. In consequence of the advance noticeable in various quarters, our exchange has been well attended, and unusually so. Producers have, however, shown on the whole sufficient readiness to meet purchasers for speedy delivery, an elasticity due to the fear of competition from abroad. Most people have, however, a very good opinion of the immediate future and count upon steady prices, if not upon an improvement during the approaching winter season. The Belgian Metallurgical Co. have received an order from Spain for 350 freight cars for the Granollers and San Juan Railroad Co. The advance in Steel in this country from Sept. 3 to October 15 has been 11 francs per ton, and this improvement would have been pushed still further if Belgian Steel manufacturers had not preferred contenting themselves with this advance rather than allow their foreign competitors to take business away from them. Meanwhile a great many commands are dropping in from all quarters, usually and remote. Dealers in iron are prepared to contract five to six months ahead;

agents of foreign dealers are making their appearance for a similar purpose, and all seem prepared to subscribe to an advance on current rates. Makers are, however, very cautious in engagements of the kind. Coal.—The strikes have terminated, and with colder weather, the demand for household Coal is becoming quite brisk. Coal for industrial purposes is gaining in strength; the companies are not anxious to sell to arrive; they prefer to see industry fully started ere fixing prices for distant delivery.

GERMANY.

(Borsenhalles.)

HAMBURG, Nov. 1, 1879.—Metals.—Iron industry is getting on satisfactorily in Germany. Most of the Rhinish works have a sufficiency of orders on hand to keep them busy for six or eight weeks to come. The demand principally runs upon sheet and Bar Iron, Iron and Steel Wire, Sheet Iron has thus far experienced less of an advance than the remaining goods we have named. Castings are in demand, and as usual Pig Iron is more immediately benefited thereby. The Borsener works are as yet not very active. The rolling mills of Germany show little readiness to sell ahead, feeling sure as they do that raw iron will improve still further. At Altenhuden, in the Siegerland, a rolling mill is being erected for the production of this Sheet Iron. The demand for Old Rails still continues, and there is again an advance of a couple of marks. Pig Iron for castings is steady with a slightly upward tendency. The production of our puddling works is in better request, and an advance seems to be impending. At Krupp's Töln Works, and at the Lower Rhinish Works, a blast furnace will be blown in each. Copper.—The German markets are in a favorable position and prices well held. Berlin quotes: English and Australian, 65 @ 68.50, and Refined Mansfield, 68 @ 68.50 marks the 50 kilos. We quote Drontheim, 68 @ 69; Minnesota, 68, and English Tough Cake, 68 @ 69.50. The tendency remains the same. Holders are quite stiff. Berlin quotes Banca, 85 @ 85.50, and English, 82 @ 82.50. We quote here Banca, 90 @ 92; English Refined, 90 @ 92; 94 is now asked for both sorts. Lead.—This metal has been doing tolerably well. Berlin quotes Tarnowitz, Hartz and Saxonia, 15 @ 15.25 marks the 50 kilos, while here we quote English Pig, 16.50 @ 17; ditto Sheets, 17 @ 17.40; German Pig, 14 @ 14.50, and Spanish, 13 marks. Spelter.—We are nominally 19.50 @ 20 marks here. At Breslau there have been no further sales. Berlin quotes 18.75 @ 20.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, Nov. 1, 1879.—Although money is scarcer the business in merchandise in general is making satisfactory progress. There is greater inclination to go into enterprises of various kinds, and goods of all sorts are favorably influenced by this growing confidence in the future. Prices have, however, been advancing less rapidly as a general thing in Austria than in other parts of Europe, where money is easier than in the case among us. In iron industry and the machinery branch this hesitation to come forward in the face of a tighter money market has been marked; we, therefore, find prices unaltered since our last report. Even the recent demand for Old Rails for America has had no influence on prices. Both Pig and Merchant Iron have been dull. The eyes of producers are, in consequence, turned toward Hungary, where the railroads of the government will have to be attended to. Copper has been looking up; we quote: Ingots, 74 @ 75 florins; Refined, 75, and Mansfield, 85 the 100 kilos. Tin is improving. We quote: Banca, 93; Billiton, 92; Australian, 125 @ 130; English, 115 @ 120, and Saxonia, 115 @ 120. Antimony is firmer at 72. Lead is advancing 80 @ 81, 50 in price, and 20 in cubes. Sheet sold at 25.50. Spelter has remained firm. We quote: Best Silesian, 24; Common Spelter for foundry purposes, 20; Sheet Zinc, No. 8, 26 @ 29.50. Nickel, 97 per cent. is nominal. Vieille Montagne, 61. White Iron (Green Seal, 41; Red ditto, 38, and Blue Seal, 36.50.

HOLLAND.

(Kook & Vlierboom.)

ROTTERDAM, Oct. 26, 1879.—Tin.—The market has quieted down a little, and both Banca and Billiton have been done at 54.50 guilders the 50 kilos. Yesterday a slightly improved tone has been observable and both sorts have brought 55 guilders, with limited offerings. Lead is higher again, with a very extensive business therein, as well on the spot as to arrive. We quote Stolberg 11.97½, and other good brands 11 guilders the 50 kilos, with little offering. P. S. Nov. 4.—Since the above was written Banca Tin has continued to fluctuate violently between 55.50 and 57.50, closing at 57 guilders; and Billiton between 55 and 57, closing at the latter figure. The deliveries of Banca since January 1, have been 121,705 staves against 120,288 in 1878, and 113,512 in 1877. The visible supply on 1st inst. was 106,059 staves against 90,079 in 1878, and 73,256 in 1877. The deliveries of Billiton in October were 23,862 staves against 69,212 in 1878, and 99,919 in 1877. Stock of Billiton in Holland on 1st inst. was 45,439 in 1878, and 39,517 in 1877. Of Lead, at the close there are offering large quantities for dealers' hands, and there is greater dullness in consequence.

EAST INDIES.

(Gillman, Wood & Co.)

SINGAPORE, Oct. 7, 1879.—Tin.—There has been keen competition for all that came in, and the price has advanced to 86 per picul. There are now only about 100 piculs unsold, and for these an advance is asked. The buying has been mainly for the United States. The shipments from the Straits for the past two months have been 36 tons, all by steamers via London, 75 tons by direct steamer from Singapore. Total shipments from the Straits settlements to the United States during the nine months have been 37,775 piculs, against 42,560 in 1878; 37,708 in 1877; 40,666 in 1876; 28,340 in 1875; 59,058 in 1874; 40,581 in 1873; and 45,113 in 1872. Freight.—There are not many free vessels in port, and rates are steady. For London and the Continent the berth at 25/ for deadweight. For New York the Rhodian has cleared, leaving only the Ring-leader on the berth. The steamer Prim took for New York, via London, 125 tons Tin, the Indus 1000, and the Celtic Monarch 125 piculs. For Boston the Winona continues loading. Exchange is firm, and first-class six months' sight credit drafts are quoted 2½/6.

A New Zealand Dealer's Criticism of Sheffield Goods.

Mr. William Wright, of Port Charles, Auckland, N. Z., writes as follows, under date of August 14th, to the Sheffield Independent:

Sad accounts of the distress in England reaches here, in which your town of Sheffield participates largely. I am sorry to hear this; and it has occurred to me to write to you on the trade of this country. The Americans are trying to gain the trade of this country, and unless the English manufacturers bestir themselves I believe the time is not far distant when they will monopolize it. Do you say how is this, when we can undersell them? It is simply because their goods are better and more adapted to our requirements.

How is it that your manufacturers go on making the same old style of goods, never considering whether they can be improved or not?

I will instance one article, axes. Now, sir, there are 4000 men in this district employed in the timber trade, every one of whom requires an ax, and uses one in a year; besides, every man in the country requires an ax, though they do not all use them up so fast. This is only a small part of these colonies, and the trade in axes alone is worth something; and, as far as I know, it is entirely in the hands of America. What is the reason of this? Because we can get them of suitable shape and good quality, which we cannot do from Sheffield. And

yet times are hard with you. Who do you think is to blame for this? Why do not your manufacturers see to this, and try to get our trade, which would help some little?

Now, sir, I have instance axes because I am connected with a business in which they are much used—the timber trade and saw-mills. But there are many other articles I could name—axes, mattocks, picks and shovels, in which the Americans are taking the lead here. I have not yet seen any American mill saws or cross-cuts; but, except your manufacturers take more care they will soon be here. The saws of two Sheffield firms are the saws mostly used. At first the saws of the firm I will call A were too hard, they would not set; now their cross-cuts are too soft, and will not stand; consequently B's are coming more into use, although the spaces are not so good, as they make too many teeth in their saws. Now, sir, this shows great carelessness on the part of your manufacturers. One of them makes a good saw, as far as metal is concerned, but totally ignores the requirements of the users as regards the teeth; the other make the teeth right, but uses bad metal.

Though we are at your antipodes, we are not so foolish as not to know when we are suited, and we like to have good tools with which to do our work. Wages are high here, and if a tool which costs a few shillings more will do more and better work, it very soon recoups the difference in the outlay. You may depend upon it that the person who will supply the best tool at the lowest price will get our custom. So if you wish to have it you must be on the look-out to see what is wanted, as the time is past when anything will do for the colonies. If you do not try to suit us the Americans will do so. In the ironmongers' shops I find a large quantity of American goods offered for sale. They are mostly rather dearer than Sheffield goods, but they are of good quality, and they sell.

And now, sir, to conclude, I am afraid you will think that I am rather severe; but I vouch for the truth of all I have said, and my wish is not to wound, but to heal. I do hope the publication of this letter will have a tendency to draw the attention of your manufacturers to the requirements of this and other markets, as it is only by studying these things that you can keep in the van as a manufacturing community. I hope you will insert this in your valuable paper, and my only excuse is the wish to benefit.

In a postscript added Aug. 29, Mr. Wright says: Since I wrote the above I have had some American cross-cuts, and they are of superior quality to Sheffield make. We also get American files, and lots of other goods.

A British Ironmaster's Views on the Past and the Future of the Cleveland Iron Trade.

Mr. Whitwell, of the well-known firm of Whitwell & Co., made some interesting remarks before a local meeting, the substance of which was the following:

During the inflated period culminating in 1873-4, the efforts made in Cleveland, Germany, America and other iron-producing countries for producing iron were enormous. Capital of all kinds was employed privately, by borrowing and through aid of bankers, who lent it too willingly, more so than they would do again. The value of finished iron went up, and so did the value of labor, and both master and man went in for luxurious living, and it was difficult to drop habits of that kind when once begun. If England was to maintain her industrial supremacy, it would only be by the exercise of economy, industry and intelligence. The speaker expressed a confidence that from the present day a gradual improvement in the iron and steel trades would show itself. He believed in the stability of Cleveland. If she boldly faced the reaction in favor of steel. He was convinced the American demand would not last, owing to their own powers of production. They were not the people to produce. They were not the people to produce. Referring to speculation in iron in Scotland, Mr. Whitwell said it was not uncommon for office boys and clerks to join in a speculation for pig iron, trying to get a profit out of the Yankee. He believed the consumption of plates and angles would be much increased, if steel superseded iron, by the manner in which the milder qualities of steel could be worked under the hammer in the hands of a thoughtful workman. He believed Messrs. Bolckow, Vaughan & Company were likely to manufacture Bessemer steel out of Cleveland ore for ship plates, and considered it could be done successfully. In some instances it had been done. Only a fortnight ago the above firm had given orders for an extensive new plant for the Eston Works, where, doubtless, Bessemer iron would be made successfully. It was only right that that firm should be the pioneers of the steel trade in Cleveland. Their steel works had been eulogized by Mr. Morrell, an eminent ironmaster of Pennsylvania, who saw them a few months ago. Mr. Whitwell said that the law enforcing the survival of the fittest was one particularly illustrating itself in the late history of the iron trade in the North of England. In 1829 there was one house in Middlesbrough. The Middlesbrough owners took their initiative in 1830, and the first cargo was shipped there about 1840. Coming down to 1874 in the history of the iron trade industry of the North of England, he found that something like 3½ millions of money had been spent in the construction of blast furnaces, and about two millions in the shape of mills and forges. In 1868, 83 furnaces were in blast, and at that time the average "make" of the district was 1,233,000 tons of pig iron, and the average selling price of the same 43/. In 1873, a year remarkable for the prosperous state of the iron trade, 132 furnaces were in blast, the increase having been gradual from 1868, the price of pig iron in 1873 reaching 120/. 1876-7-8-9 showed a gradual decrease in the number of furnaces blowing in the North of England. In 1877 the make was 2,138,000 tons, and now it might be put at 1,750,000 tons per annum. During the past five years the price had fallen from 60/ to 33/ per ton; and was it any wonder that the value of materials for making iron and the price of labor had decreased? The three great

items in the cost of a ton of pig iron were the royalty, the capital invested by the owner, and the labor. The price paid for labor fell with the decreased demand for it. The speaker then referred to the effect of the call for steel rails upon the finished iron trade of the north, showing that the production of iron rails in 1873 was 324,000 tons, whereas in the present year some 60,000 tons would be made.

LABOR AND WAGES.

The Dover (Morris county, N. J.) Iron Era says: The Glendon Iron Company promised their men at Hurdtown, Hibernia and Teabo, a raise from \$1 to \$1.25 per day for the month of October. When the men received their pay for September they were agreeably surprised to find that the advance had been given them dating from Sept. 1.

On the 11th inst. the hands at Sieger & Bro's ore mine, at Siegersville, Pa., went on a strike for higher wages. They wanted \$1 per day. The striking miners endeavored to induce other miners in their vicinity to strike also, but were not successful.

Advices from Cincinnati, Nov. 11, say: Strikes are the order of the day in the Ohio coal mining regions, prompted by the present high rates of coal here. At Cambridge the miners came out of the mines yesterday and demanded 3 cents per bushel advance. In the afternoon some who were willing resumed at 2½ cents. All east of the town were at work to-day at the latter figure, but at the Ohio Coal Company's mines the men still held out. From Massillon comes the intelligence that all the miners, except those of two mines, are out on a strike, the result of the proprietors refusing to advance their pay. At Indianapolis, Ind., it is stated, there is less than a week's supply of coal should cold weather come.

The puddlers at the Baltimore and Ohio Rolling Mill, Cumberland, Md., who are now working for \$3.50 a ton, have put in a request to the superintendent of the mill for an increase of wages to \$4 a ton. They do not contemplate an aggressive strike, but have notified the company that if their request is not complied with in two weeks' time they will quit work. The helpers, who get one-third of the amount given the puddlers, join with the latter in their request.

The None-Such Mill, Norristown, Pa., resumed operations on Monday, November 10. The puddlers have accepted the offer of 50 cents per ton, making them \$4.

Hay & Co., window glass manufacturers, Winslow, N. J., have advanced the wages of their blowers 10 per cent. over those of last year.

The trouble at the glass works of Gill Bros. & Co., at Steubenville, Ohio, has been very much misrepresented. The statement of the employees that the manager discharged them all without notice, but offered to take them back if they would agree to make 420 lamp chimneys at the same figure they now get for 300, we are authorized to state is false. The question at issue was as to the manner of working, not wages. They worked a larger shop, and the pay would have to be divided differently, but the total cost per 100 for making the chimneys was to be the same as formerly. The trouble is now settled on a basis of four in a shop, instead of three, as before.

By advices from Wilkesbarre, Nov. 15, we learn that the miners throughout the Wyoming and Lackawanna coal fields are becoming very uneasy upon the subject of wages. The miners of the Lehigh and Wilkesbarre Coal Company have already held several informal meetings to appoint committees to confer with the men at other points with a view to co-operation in making a demand for more wages. This movement has been stimulated by the action of President Gowen of the Philadelphia and Reading Company in voluntarily increasing the rates of wages of the men in the employ of his company. No such action has been taken by any of the companies operating in Luzerne or Lackawanna counties, and the men have apparently determined to make a formal demand. Those at some of the mines would be satisfied with a 10 per cent. advance, while others advocate 15 and 20 per cent. If the miners' demands are not acceded to, they assert they will strike before the holidays.

The Strength of Wrought Iron Railway Axles.

At a meeting of the English Society of Engineers, held on October 5th, a paper was read by Mr. Thomas Andrews on "The Strength of Wrought Iron Railway Axles." In introducing the subject, the author gave a brief historic sketch of the Wortley Iron Works, Sheffield, at which works some of the first railway axles used at the commencement of the railway system were made, and, as an interesting fact, he mentioned that these works were supposed to have been established at the time of the Roman conquest. He enumerated a series of practical experiments which he had conducted with a view of showing the great resistance which best fattened scrap axles are capable of offering to sudden strains, and considered at some length the question of iron versus steel as a material for axles. The chief standard tests employed by railway companies and engineers were then given, and their relative merits pointed out. Then followed an account of a large number of experiments on axles manufactured by the author to comply with the various tests. These results tended to show that in some cases the deflection of the axles became less as the number of blows to which they were subjected increased, which it was thought might be due to the heavy blows having a tendency to alter the molecular structure of the iron, and render it more crystalline. From various other experiments which were given, it was shown that the actual quality and tensile strength of an axle might be misjudged, and wrong conclusions formed as to its quality, by solely relying on a falling test. The author strongly advocated one uniform test for axles, and thought that in any correct process of axle testing the amount of testing force actually applied should be measurable, and bear some relative proportion to the greatest amount of shocks to which an axle

was likely to be subjected in actual working, and suggested that it would be desirable to obtain, by accurate experiments, an approximate estimate of the work done by the axle in ordinary working, and to arrange some test which could be universally agreed upon.

A Large English Steel Steamer.

Mr. John Burns, a large English shipowner, announces in the London Times that his firm have concluded a contract with Messrs. James and George Thomson, by which that firm is to build on the Clyde, for their fleet, a screw steamer, the size of which will be exceeded only by that of the Great Eastern, while the speed will be greater than that of any ocean steamer afloat. This new vessel will be of 7500 tons and 10,000-horse power, her dimensions being 500 feet in length, 50 feet in breadth, and 41 feet in depth, propelled by inverted direct-acting compound engines, with three cylinders and seven oval tubular boilers, having 38 furnaces and 1000 feet of effective fire-grate surface. She will have an extra promenade deck, and will practically be a five-decker, being fitted for 450 first-class and 600 steerage passengers, with accommodation for a crew of 200 officers and men. Her cargo capacity will be equal to 6500 tons, with 1700 tons of coal and 1000 tons of water ballast, having a double bottom on what is called the "longitudinal and bracket system." Among the important matters into which they have crucially inquired has been that of the employment of steel instead of iron, and after a practical and thorough examination into the merits of both materials, they have adopted steel for the hull and boilers, but under a provision so stringent that every plate, before acceptance, will undergo a severe and rigid test by a qualified surveyor appointed and stationed at the steel manufactory for that special purpose, and that the manipulation of the steel by the builders shall be subject to an equally careful supervision by qualified engineers of their own appointment. The steel is to be made by the Siemens-Martin process, and all rivets as well as plates throughout the ship are to be of steel. The name of the new vessel is to be the Sahara, and she is to be ready for sea in March, 1881.

The Mill Coal Mine Tunnel.—The tunnel at the Mill coal mine, owned by the Cambria Iron Company, has just been completed after a year's work, and the gentle mule now gives place to the iron horse. It is about one mile and a quarter long, 9 feet wide, and in places as many as 25 feet high. The daily output of coal is about 650 tons. Hitherto it has cost 16 cents per ton to deliver the coal at the mouth of the mine. The construction of the tunnel and all its appliances cost about \$12,000. Estimating that at least 6 cents is saved on the carrying cost of each ton of coal, the tunnel will pay for itself in one year. On Joder Hill, about 2½ miles from the mouth of the mine, a stone building has been erected, in which are a 20-horse-power horizontal engine and a Murphy fan for supplying the needed amount of air to the miners and carrying off the smoke made by the locomotives. A 12-foot shaft 100 feet deep has been sunk down which, through the mine workings, and along the railway tunnel an immense and steady volume of the mountain's purest air is sent on its errand of mercy. Perfect ventilation being thus secured, the only objectionable feature of the locomotive system is overcome. The mine may be likened to an immense fallen tree, along the trunk of which the locomotive runs, the cars being collected from along the branches by mule power. The locomotives make a round trip once every half hour. They carry immense loads; they never get stubborn on the hands of their drivers; they do not fall down and break a leg, thus occasioning delay and loss; they are swift and tireless, and their appetite, although a voracious one, is appeased by the very black diamonds which they haul. They have proven themselves to be a success, and the mule has "gone."

The Omaha Iron and Nail Works.—The managers of these works are nearly all old Pittsburghers. Mr. Wilson, the business manager, having once been a partner in the firm that is now Chas. Smythe & Co. The works are located three-fourths of a mile from the business heart of the city, adjoining the Union Pacific Railroad track, and occupy one block of ground. The firm commenced business with six nail machines, in March last. They now operate 22. Their main engine is of 250-horse power, and is used in driving the machinery of their rolling mill (the train being 18-inch), and the shears for cutting scrap iron, railroad bars, &c. They have two heating furnaces, and a battery of three boilers, and intend to erect another soon. They also have a 40-horse-power engine for driving the nail machines. They cut all sizes of nails, from a 60-penny down to the finest inch finishing nail. This second engine also drives the grindstones. They also have a blacksmith's shop, where they manufacture and repair their machinery. Their furnaces have a capacity of from 10 to 15 tons of iron per day, which is about the amount of plate they cut each day. They manufacture all of their plate from scrap. They employ about 100 men in the different departments.

The Vesuvius Railway.—The line of railway which is to facilitate the ascent of Mount Vesuvius is now completed. It is 3000 feet in length, and will carry passengers to the very edge of the crater. The line has been constructed with great care upon a solid pavement, and it is believed to be perfectly secure from all incursions of lava. The mode of traction is by two steel ropes put in movement by a steam engine at the foot of the cone. The wheels of the carriages are so made as to be free from danger of leaving the rails, besides which each carriage is furnished with an exceedingly powerful automatic brake, which should the rope by any chance break, will stop the train almost simultaneously. One of the chief difficulties of the undertaking was the water supply, but that has been obviated by the formation of two very large reservoirs—one at the station, the other near the observatory.

INDUSTRIAL ITEMS.

NEW YORK.

The Albany City Iron Co. have lately commenced repairing their two furnaces, and when the repairs are completed it is the intention of the company to run one on foundry and the other on Bessemer iron. The repairs will be completed some time in January. These furnaces have been idle for 4 or 5 years.

NEW JERSEY.

The Singer Sewing Machine Works of Elizabeth are erecting an additional foundry 200 x 100 feet.

The Andover Iron Company are erecting extensive water works near their furnaces. A brick structure 18 x 26 feet is being built on the banks of the Delaware, in which will be placed a powerful force pump of sufficient capacity to supply the whole town of Phillipsburg with water.

MASSACHUSETTS.

One of the largest chains ever made in this country has just been finished in the Boston chain works, South Boston. It is 450 feet long, and weighs 28,000 pounds. It was made for Mr. Robert Palmer, of Noank, Conn., for Palmer's marine railway, and will be used for hauling up on the ways the largest Sound boats.

The Ames Company, of Chicopee, are to cast the Samuel Adams statue for the city of Boston.

The Spencer Wire Company, of Spencer, have been able to run their mills but part of the time recently, on account of low water.

CONNECTICUT.

Beach & Co. and Hillier & Bunce, Hartford, have rebuilt the machine shop which was destroyed by fire over two months ago, while occupied by the Hartford Foundry and Machine Company.

PENNSYLVANIA.

The Patriot says that all the industrial works around Harrisburg are in operation without one exception.

Messrs. Sterling, Weidner & Co., boiler makers, Reading, employ about 40 men, and are very busy on orders for Philadelphia, Pottstown and some other Eastern Pennsylvania cities.

Messrs. Coffrode & Saylor, of the Philadelphia Bridge Works, at Pottstown, are about commencing the enlargement of their establishment by the erection of an addition on the south side to connect the two wings of the building. When completed the entire building will be about 500 feet in length by 120 feet in width. Business is active in this large establishment, and the future looks very encouraging.

The Ringgold Furnace, at Ringgold, Schuylkill County, was blown in on the 10th inst.

The Lebanon Valley Furnace, Lebanon, which went out of blast recently, has been repaired and blown in again.

The Chulasky Furnace, Northumberland County, has been successfully started, and is now running well and shipping the iron to the Glendower Mill. The first cast was made on Saturday, the 9th inst.

The stonework for the vertical hoist at No. 1 Blast Furnace, Berksboro', has been completed, and the carpenters have commenced putting up the woodwork. The gas flues to the hot-blast chambers are also nearly finished, and it is expected that the furnace will soon go in blast.

The nail factory of the Reading Iron Company is making overtime.

The employees of the Scott Foundry, Reading, are at present working four hours per night for four nights in the week.

Workers were busily engaged on Friday, the 14th inst., making preparations to raise the large sheet-iron stack at the furnace of the Pottstown Iron Company. The work is being done by Messrs. Coffrode & Saylor, and is in charge of Daniel Coffrode. The stack is about 60 feet high, and is to be raised on a brick pier 17 feet high.

The Millerstown Furnace at Macungie was sold at sheriff's sale, on the 8th, for \$90,000 to Isaac McHose. Mr. McHose has transferred the property to a number of Reading, Millerstown and Philadelphia parties, as he only bought it to secure a second mortgage he held against it. Repairs have been commenced, and it is expected the furnace will be in full blast within five weeks.

Report is current that Matilda Furnace, near Mount Union, is soon to be put in blast. The furnace has been lying idle for several years, and if operations are resumed it will add much to the business vitality of Mount Union and vicinity.

Hoven & Son's blast furnace, Norristown, was blown in November 9, 1879. The Lucinda Furnace, formerly owned by Schall & Sons, will be in operation in a few weeks. Mr. McHose, of Reading, has examined the Bechtelsville Furnace for a party of capitalists who contemplated buying it, and has reported favorably as to the purchase.

The report that the old stove foundry at Rovers Ford has been leased by a company who propose carrying on the manufacture of stoves and hardware, is at least premature. No arrangements have yet been made to this end.

The increased facilities afforded by their new foundry have enabled Messrs. Sheeler, Buckwalter & Co., of Rovers Ford, to more than double their business. Their molding room is full with the exception of five floors, and these will be occupied as soon as they can get men.

The Emma Furnace, Mifflin County, which has been idle for several years, is being repaired, and the managers expect to have it in blast about January 1st, with coke as fuel instead of charcoal, as formerly. Besides changing the fuel, it is the intention of the managers to enlarge the furnace so that the bushes will be 9 feet 4 inches, and height of stack 36 feet.

Clark's machine shop, at Dean City, is now running full time.

PITTSBURGH AND VICINITY.

Very early on the morning of the 17th, a fire was discovered in the ax tempering department of Hubbard, Bakewell & Co.'s works. The fire soon spread to the polishing and saw department, the cutting room paint shop and box factory. The loss will probably reach \$10,000 or \$12,000, fully covered by insurance.

The stack house at the Isabella Furnace is now being enlarged 100 feet, and will be finished some time during the present month.

The gas furnaces at the Pittsburgh Forge and Iron Company's mill, Allegheny, is being worked again after several weeks of idleness, and two more puddling furnaces started up this week.

Smith, Sutton & Co., of the La Belle Steel Works, employ 300 men, and are running their establishment full double turn in all departments. The Siemens furnace lately added is working satisfactorily. The annual product of these works is 6000 tons of steel.

The last statement of the Verona Tool Works shows that the Pennsylvania Railroad have 3,463,185 Verona nut locks in use. The Chicago and Northwestern have 1,639,690. The entire list comprises 113 roads, and 2,056,652 have been sold to other roads through agents. The total number in use was 15,899,108.

Twelve of the 50 new coke ovens belonging to A. A. Hutchinson & Bros., at Mount Pleasant, were fired last week. The balance were fired this week. This firm have all the business they can attend to.

Messrs. H. C. Frick & Co. are the largest coke dealers in the United States. They own 761 ovens, and are building 400 more. They have contracted for all the coke produced by 958 ovens besides, which gives them a capacity of about 3000 tons daily.

Messrs. Long, Williams & McDowell, assumed the proprietorship of the Keystone Rolling Mill, on Tuesday, Nov. 11. The lease by which the National Tube Works Co. have been running the mill expired on that date. The mill will not stop in any respect.

The large shipments from Lewis, Oliver & Phillips' warrant the assertion that they have immense orders for their specialties this season.

Dilworth, Porter & Co. have lately received 12 car loads of old rails from England, this being part of an order for 4000 tons, which were bargained for in August last.

There was a meeting of the Monongahela City Industrial Improvement Association lately, to consider the proposition of Mr. Abram Reese, of Pittsburgh, Mr. Reese agreeing upon certain conditions to build a hoe factory, with a large capacity, and making at this city the exclusive manufactory. After a careful consideration the proposition, with a slight modification by Hon. Geo. V. Lawrence, was accepted. The cash bonus required by Mr. Reese was nearly all subscribed.

Kirkpatrick, Beale & Co., Leechburg, will increase the capacity of their mill by putting in an additional set of sheet rolls.

Last Wednesday the Birmingham Rolling Mill, situated at the corner of Fifteenth and Sixteenth streets, bordering on the Monongahela River, was sold by the assignees. The bidding upon the mill was started by an offer of \$30,000 from the cashier of the Second National Bank, Mr. Davidson. Mr. Wm. B. Rodgers, for Harry Oliver, bid as high as \$72,000, and subsequently Major J. F. Slagle bid \$81,050, and the property was knocked down to him. It is intimated that it will pass into the possession of Mr. Oliver, who has a lease of the mill until next August. The price is regarded as a good one, and an indication of the increasing value of property. This is the old McKnight, Duncan & Co.'s works.

The Governor of the State has issued a charter to the Manchester Iron and Steel Co., of Pittsburgh, with a capital stock of \$500,000, divided into 500 shares. This company will operate the Old Superior Mill. The co-operators are members of the Old Superior Iron Co. and are as follows: John Scott, Alex. Nimick and James I. Bennett, of Pittsburgh; Daniel J. Morrell, Johnstown; John N. Hutchinson, Easton; John M. Kennedy, Philadelphia, and the Cambria Iron Company.

WEST VIRGINIA.

Messrs. A. J. Sweeney & Sons, Wheeling, bought last week the Quincy, or, as it is better known, the Hamilton Foundry, for \$12,000. The original cost of the foundry was over \$75,000, and it still retains the greater part of its extensive and costly equipment. Messrs. Sweeney & Sons will pay particular attention to marine machinery, also to mill work. They will be prepared to furnish duplicate parts of the Hamilton pulverizers, as they have full control of repairs for that machine.

Fisher's Foundry, Wheeling, resumed on the 11th, after a brief delay, caused by repairs to boilers.

OHIO.

The steel spring and axle works of Houston Hay, at Coshocton, are in full operation, with plenty of orders ahead.

The rail mill at Columbus is running but little more than half time, owing to the impossibility of procuring supplies.

The blast furnace of the Steubenville Furnace and Iron Co., at Steubenville, has been doing so bad lately that it became necessary for the company to make some change or blow her out. She has not been averaging more than eight tons of iron per day. Last week the directors induced Mr. Henry Opperman, now manager of the Jefferson Furnace, to take hold of her and try and bring her out again. He has succeeded beyond anticipations. On Saturday she was making iron at the rate of 15 tons per day. He thinks with good management and care she can be brought back to her old standard.

The furnace has been a good one, but the company have been unfortunate, owing to financial embarrassments. There are upward of 50 men and boys employed in the mine and about the coke ovens and furnace. The Aikana Rolling Mill, three miles above Steubenville, has been operated for some time by the Pittsburgh Forge and Iron Company. The mill has 10 puddling furnaces on double turn, manufacturing muck for their mill at Pittsburgh. About 65 men are employed about the works. They mine coal from their shaft near the mill, which is 96 feet deep, and hoist about 900 bushels daily.

The Bellefonte Furnace, Ironton, is still in blast, working well, making her average number of tons of No. 1 iron per 24 hours.

Hall's Rolling Mill, Hubbard, is now working double turn.

The Aetna Rolling Mill, Bridgeport, is now running at its fullest capacity, and the

orders received are far in advance of what it can fill.

The blast furnace of the Bellaire Nail Works, at Bellaire, has some difficulty in getting enough coke, and the fires may have to be banked a while, as none can be procured by the river.

Lambert & Gordon have commenced placing the machinery in the Tyler Hoe Works, Ironton. The principal parts furnished by them and to be used in the manufacture of hoes, are the engine (cylinder 16 inches by 3 feet, fly-wheel 8 feet), a steam hammer, and shears for trimming hoes, 4 work before accomplished by hand.

The Howard and Buckhorn Furnaces, at Ironton, will be sold at sheriff's sale on December 13, 1879.

The Jackson Furnace property will be sold at public auction December 6. It is appraised at \$30,000.

The Eagle Furnace, Vinton County, has been purchased by Columbus parties, it is said.

The Portsmouth Foundry and Machine Works are working on a new and large pulley to run the little mill of the Burgess Steel and Iron Works. It will be 12 feet in diameter, 22-inch flue, and will weigh four or five tons.

The Jefferson Rolling Mills, at Steubenville, Ohio, are on full, double turn, in all departments, and are shipping their product, nails, as fast as manufactured. They produce between 4000 and 5000 kegs per week. They have 22 puddling furnaces, three heating furnaces, two large blast furnaces (but one of which has been in blast lately), large nail factory, extensive coal mine, entered by a shaft near the mill, from which 7000 bushels of coal are hoisted daily and run into the furnaces in the mill, and to their coke ovens, 112 in number, where coke is made for their blast furnaces. Mr. David Spaulding is president of the company, and gives affairs his personal attention. The furnace in blast has a 50-foot stack and a 12½-foot bosh; has been doing well and produces about 40 tons of good metal per day, making a cast every six hours. The other furnace will be put in blast as soon as it is possible to get ore to operate her. They employ in all departments about their works upward of 600 men and boys, whom they pay off every two weeks.

The Eagle Furnace property, situated on the line of the railroad now building between Gallipolis and the Marietta crossing, and embracing 6000 acres of valuable ore and coal deposits, which was owned by William Shober, C. W. Henking, P. A. Sanna and Wellington Hawkins, of this city, has been sold to James A. Simmons for the sum of \$40,000, cash.

J. Woodruff & Sons, stove manufacturers at Salem, are running their works to their fullest capacity. This is necessary even with their increased facilities for turning out stoves. The order book of the firm is in a plethoric condition, showing 630 stoves to be delivered, and the outlook is encouraging.

The Niles Tool Works, Hamilton, have an order from Nottingham, England, for one of their large turning and boring machines, and a good order from Ghent, Belgium, for their machinery. The works are very busy on orders, working a full set of hands an average of 13 hours per day. On some work they are running night and day. Electric light has just been introduced for lighting the foundry and machine shop.

The Sellow Manufacturing Company's works, at Cincinnati, which have been idle for some time, have recently resumed active operations, under the management of a new company, who are well acquainted with the manufacture of stamped tin and Japan ware. The works are now running full and supplying orders that have been booked for some time. At the same time they are filling up their stock rooms in anticipation of a heavy spring trade in the coming year.

INDIANA.

Advices from New Albany, November 10, says: The Ohio Falls Iron Works, New Albany Woolen Mills, New Albany Mill, Steam Forge Works, and other industrial establishments of this city, that were compelled to shut down last week by the coal famine, resumed work again to-day with a full force, having received a supply of coal from the Clay County mines at Brazil. These establishments consume 6000 bushels of coal daily. The Water Works Company are running their engines with wood, being out of coal. A good deal of coal is being brought up the river in barges from the Cannelton mines, but it is sold at 25 cents a bushel, a price that does not justify its use by the manufacturers. The De Fawcett American Plate and Window Glass Works still have a supply of Pittsburgh coal, and will add to this from the Clay County mines in sufficient quantity to keep these immense works running. Fifteen hundred idle men were put to work this morning by the resumption of the factories.

ILLINOIS.

The Lock Stitch Barb Fence Co., Joliet, is building a fire-proof building, 60 x 150, which it will use for manufacturing its barb fence. The Gates & Scoville Mfg. Co., Chicago, have just completed work on a contract for \$15,000 worth of mining machinery for a Western mining company.

While the bar and other mills of the Springfield Iron Co., Springfield, are running steadily, the rail mill of the same firm loses an occasional day for want of old rails.

MISSOURI.

The Missouri Car Wheel Co. have about finished their new shops in the south part of the city, and the car shops have been transferred from Cambridge City, Ind., to St. Louis. A larger run on car wheels has been made during the past month than ever before in the history of the company.

Some feeling is again being awakened in reference to the practicability of establishing a locomotive works in St. Louis.

MICHIGAN.

The Carp River Furnace at Marquette is running most satisfactorily, turning out from 25 to 30 tons of iron daily, mostly Nos. 1 and 2.

The Ishpeming Foundry has never been so crowded with work as it is now. The product of the foundry is principally mine machinery.

KENTUCKY.

The Ashland Furnace is working well,

making about 41 tons of good No. 1 iron per 24 hours, using only raw coal for fuel. They have many barges loaded waiting for a small rise in the river.

The Clear Creek Furnace is to be started next spring.

A new steel company has been formed in Louisville, under the name of Crucible Steel Casting and Metal Company. Steel furnaces and annealing ovens are being built. The company will not be able to begin operations before December 15. The officers of the company are: President, Lewis Clark; treasurer, O. A. Knapp; secretary and manager, Julius Barbaroux.

In our last issue we referred to the burning of the Pennsylvania Furnace. The total loss has been estimated at about \$15,000, with no insurance. It is thought the proprietors, in the event of their continuing the business, would prefer to build elsewhere than at Riverton, as the timber resources there are about exhausted.

TENNESSEE.

The sale of the Tennessee Iron and Steel Company's works, at Chattanooga, has been indefinitely postponed. It is quite probable that arrangements will soon be made for operating the mill and paying off the indebtedness.

NEBRASKA.

The Omaha Iron and Nail Works are in successful operation, and are turning out 300 kegs of nails per day.

The Ingenuity of a French Jailbird.

At a recent trial before the police court at Poitiers, France, a thief named Mignon gave in his examination the following interesting account of his escape from jail:

"When I arrived at the Poitiers prison for the first time last June, I was placed alone in a cell. At that time my first idea was to commit suicide. With this end in view, taking advantage of the fact that my handcuffs had been removed for awhile to allow me to eat while the keeper was attending to prisoners in the adjoining dormitory, I tore a long strip from my sheet in the direction of the tread, intending to hang or strangle myself with it. On second thought I abandoned this plan, especially as I noticed that the bars of the window were not solid, and that I might escape."

"I then concealed the strip of linen in my mattress, with the intention of using it at some future time. My first care on reaching my cell had been to examine it. I found under the bed, in a place which I will show you, a small knife blade. With this knife I fashioned one of the little heath sticks, which served to fasten the complement of the weight of my ration of bread. While my handcuffs were removed to allow me to eat, I sharpened one of these sticks, which was forked, and I used it as a key to unlock my handcuffs. I will show you how I did this."

This was done, as will be seen below, and the prisoner continued his story:

"As soon as the rounds were over I free to take off my handcuffs and find myself free in my cell. One day, during the walk which I was made to take every day in the yard of the cell prisoners, I found a piece of wood the size of my finger. I carried it to my cell after having concealed it in the lining of my pants, and then with the knife blade I carved a wooden key—if you wish I will make a similar one in your presence—and with this wooden key I could unlock my handcuffs as easily as with a real key. I forgot to tell you that in order to complete my key I made use of a nail which I had found in the yard."

"From the time that I was thus able to free myself from my handcuffs I began to prepare my escape. I first endeavored, with my knife blade, to loosen one of the bars of the window of my cell. I successfully removed the mortar from the upper and lower ends and had managed to almost entirely loosen the bar on the right. All I had to do was to bend it in order to pass. But there was a solid shutter which was bolted at night, and it would have taken me too long to open this bolt from the inside. I therefore decided to try the door."

"In order to conceal the holes which I had made by removing the mortar, I filled them with bread, on which I placed a layer of plaster which I scraped from the wall of the cell. I worked about a fortnight on the window."

Mignon then relates how he accomplished an analogous work, in order to escape from his cell simply through the door:

"By means of my nail and my knife blade which I had sharpened on my earthen pitcher, I cut into the wood opposite the lock. In this way I disclosed the interior of the lock, and was able to work the spring with my finger, and the door opened easily."

"I concealed the hole which I had thus made with bread which I kneaded with brick dust. I also added to the mixture the dust of a piece of slate which I had found in the yard. In this way I gave the bread the color and appearance of wood. From that moment I was sure of being able to leave my cell when I pleased; I had only to wait for a favorable opportunity."

The motive which decided Mignon is worthy of mention:

"I waited thus, without being able to come to a determination, until two days before I was to appear before the assizes, and then, unwilling to incur the shame of appearing in court at Poitiers, where several people know me, I decided, on the night of the 10th to 11th of August, to carry out my plan."

Mignon next relates how, having noticed that at a certain time the guards neglected to close the door of the hall which led from the basement, where his cell was situated, to the ground floor of the prison, he took advantage of the fact. He left his cell, passed out of the prisoners' quarters and took citizens' clothes. He then tells of his peregrinations through the prison, of the alarm given him by the passage of a guard with a lantern. We follow him into the office of the warden, where he has the audacity to take the keys from a closet. He takes a lamp in the hall to help him choose from the bunch the key of the prison director's garden."

"Once in the director's garden I examined the four corners for the best place to climb over the wall, and I found a tree which was higher than the wall. I climbed it and

reached the top of the wall. I then saw that this wall overlooked a small deserted street. I then climbed down again and pulled up a wooden post, which served as a balancing pole, to enable me to walk along the wall to the corner."

"When I had reached there I fastened to this post the strip of sheet which I mentioned above, and which I had wound about my body before leaving my cell. I then allowed this strip to hang over into the street, and I let myself down, the post acting as a counterweight. The strip was more than long enough to reach the ground, and I do not think that I made any noise in falling, as I was barefooted. I let go of the strip, which was drawn back into the garden by the weight of the post. I then went off toward the station."

Mignon affirms that no one assisted him in escaping. Of course he did not take the train to leave Poitiers. He started off on foot toward Limoges, traveling almost all the time through fields. Reaching Montmorillon he was given clothes and a sum of 200 francs by a person whose name he refused to give. After having shaved and taken a bath, he again started off on foot for Bellac, then for Limoges and Guéret. Thence he went by rail to Montbrison; from Montbrison he footed it to Bourg, and it was on reaching this place that he was recognized and arrested. Being asked what he wanted to do at Bourg, he answered:

"I had gone to Bourg to get some money which I had hidden there after committing a theft in Paris during the Exposition. I had stolen an American's portfolio, containing 8000 francs in bank notes, at the Champ-de-Mars. I knew that he was an American by the papers which I found in the portfolio."

The report of the examining magistrate closes with a statement which would certainly bring Mignon an engagement at the Folies-Bergère or at the circus, did he not happen to be behind safety locks:

"At this moment, by means of a small forked heath twig, the prisoner readily unlocks his handcuffs, which had been put on in our presence and carefully locked. Then, in the space of a few minutes, with a dull knife, he makes a sort of key, to which he fixes a nail, and with this he readily locks and unlocks his handcuffs in a few minutes."

After listening to this report the court condemned Mignon to one year's imprisonment. But where is the portfolio?

GLASS ITEMS.

The New Glass House, at Wellsbury, W. Va., is rapidly approaching completion. The furnace is completed, the framing of the roof is up, the factory is inclosed and floored, and everything points to the finish of the works at least thirty days before the time set.—*Wheeling News-Letter.*

The French Window Glass Works, at St. Louis, are again in operation. The furnace never worked better.

The Hemingray Glass Works, Cincinnati, have been compelled to draw the bars at one furnace, owing to the coal famine. The Bellaire Goblet Co., Bellaire, Ohio, have issued a card refusing to book orders for shipments prior to January 15th, 1880, at which date prices will be advanced at least 10 per cent.

Hobbs, Brockmeyer & Co., of Wheeling, are said to be getting 52 pots of glass per week from their 13-pot glass furnace.

The Cape Cod Glass Works, at Sandwich, Mass., are to be sold at sheriff's sale, December 5th.

PITTSBURGH AND VICINITY.

Evans & Co. are now working 52 shops and turning out large numbers of chimneys.

Bryce, Higbee & Co., are erecting at their Homestead (Pa.) glass factory a cooper shop 125 x 50 feet, and will hereafter manufacture their own packages and not be dependent on the market for them.

Finn has been put into the furnace of Cunningham's bottle house on the Southside, which has been idle for some time, and blowing was to commence last Monday.

The second bottle house of A. & D. H. Chambers, this city, blows in Saturday, November 15th, after being idle for some weeks for repairs.

The old bottle house of S. McKee & Co., Southside, which was torn down some time since, is to be replaced by an 8-pot glass furnace and buildings.

The Ihmsen Window Glass Company, Limited, have embarked in the bottle-making business, and an old abandoned furnace has been refitted and the fires started.

The Dithridge Chimney Co., Limited, report more orders on hand than they can fill, and regret that they did not start their second furnace a month ago. As to prices, there would, they think, be no difficulty in securing an advance if the manufacturers would only act in concert. As it is, one or two men keep prices down by "cutting." Goods ought to be 20 to 25 per cent. higher, as the cost of making has increased to very nearly that extent. The company shipped, last month, within a fraction of \$20,000 worth of chimneys, nearly all of them at a slight advance over current rates. The same quantity of goods, in the flush times succeeding the war, would have brought in \$50,000.

The citizens of Cumberland, Md., are making an effort to attract the attention of manufacturers and architects to the advantages of that city for manufacturing. These advantages are, briefly, free land, cheap and excellent fuel, low and uniform taxes, abundant supplies of ores, limestone and glass sand, competing railway transportation to all points, cheap water freights by canal to and from the seaboard for nine months in the year, an attractive town, good schools and churches, cheap living and exceptional healthfulness. These advantages are certainly important, and should secure a rapid and sustained industrial development.

We have received from the Secretary of the Hardware Board of Trade, a copy of formal resolutions of respect to the memory of the late Joseph Merwin, and tendering sympathies to his family and friends.

The Iron Age Directory and Index to Advertisements.

AGRICULTURAL IMPLEMENTS.	PAGE.
Johnson, Gere & Truman, Oswego, N. Y.	30
Wheeler & Melick Co., Albany, N. Y.	30
Clark & Co., New York, N. Y.	30
Clayton Steam Pump Works, 14 and 16 Water st., Brooklyn, N. Y.	30
Albany Hardware Co., Albany, N. Y.	30
Rucker & Dorsey, Indianapolis, Ind.	30
Anti-Friction Metals.	30
James Paul Philadelphia, Pa.	30
Anyals, Manufacturers of.	30
Fisher & Norris, Trenton, N. J.	30
Stina Iron Co., 86 Goreck, N. Y.	30
Augers, Bits, etc., Manufacturers of.	30
Seidinger & Co., 254 Chambers, N. Y.	30
Sedgwick Mfg. Co., Poughkeepsie, N. Y.	30
Snell Mfg. Co., 81 Beekman, N. Y.	30
Porter & Wooster, Boston.	30
Axles, Springs, &c., Manufacturers of.	30
Book R. & Sons, 123 E. 14th, N. Y.	30
Hochstetler Guy C. Field & Co., 523 E. 14th, N. Y.	30
Lambertville Iron Works, Lambertville, N. J.	30
Shelton & Co., Auburn, N. Y.	30
Babbitt Metal.	30
Philadelphia Smelting Co., 12th and Noble, Phila.	30
Bag Holder.	30
Springfield, Jeff., Ashland, Ohio.	30
Barb Wire.	30
Scott H. B. & Co., Buffalo, N. Y.	30
Belted, Manufacturers of.	30
Scott Geo. M., Chicago, Ill.	30
Bells (Electric).	30
Berlin Bros. Mfg. Co., Easthampton, Conn.	30
Belting, Makers of.	30
Alexander Bros., 412 N. 3d, Philadelphia.	30
Perth Amboy Terra Cotta Co., Perth Amboy, N. J.	30
N. Y. Belting and Packing Co., 37 Park Row, N. Y.	30
Bicycles.	30
Pope Mfg. Co., 65 Summer, Boston.	30
Bird Cages, Makers of.	30
Jewett John C. & Sons, Buffalo, N. Y.	30
Indeeman Co., 254 Pearl, N. Y.	30
Maximilian John, 27 and 29 Pearl, N. Y.	30
Blitz Braces, Manufacturers of.	30
Backus S. & Co., 123 Chambers, N. Y.	30
Fray & Pigg, Bridgeport, Ct.	30
Millers Falls Co., 74 Chambers, N. Y.	30
Blacking, Hg.	30
Hills W. J., Bridgeport, Conn.	30
Black, Tackles, Makers of.	30
Burr & Co., 123 Chambers, N. Y.	30
McMillan Wm. H. & Bro., 113 South, N. Y.	30
Penfield Block Works, Lockport, N. Y.	30
Providence Tool Co., Providence, R. I.	30
Brooms.	30
Eames' Petroleum Iron Works, Titusville, Pa.	30
Belt Carriers.	30
National Bolt and Pipe Mach. Co., Cleveland, O.	30
Sellers Wm. & Co., Phila. and 75 Liberty st., N. Y.	30
Wiley & Russell, 123 Chambers, N. Y.	30
Bolt Forging Machines.	30
Forsyth, S. C. & Co., Manchester, N. H.	30
Bolts (Screw).	30
Coleman Eagle Bolt Works, Philadelphia.	30
Boat and Shoe Heel Stiffeners.	30
Lyon N. Albany, N. Y.	30
Brass, Manufacturers of.	30
Ansonia Brass and Copper Co., 19 Cliff, N. Y.	30
Bridgeport Brass Co., Bridgeport, Conn.	30
Brass Goods Mfg. Co., 41 Chambers, N. Y.	30
David John & Sons, 100 John, N. Y.	30
Holmes, Booth & Hayden, 49 Chambers, N. Y.	30
Manhattan Brass Co., 81 Reade, N. Y.	30
Mercantile & Co., 67 Market st., Phila.	30
Phane & Atwood, 123 Chambers, N. Y.	30
Bone Iron Works, Rome, N. Y.	30
Scovill Mfg. Co., 41 Monroe, N. Y.	30
Waterbury Brass Co., 22 Broadway, N. Y.	30
Brass Foundries.	30
Reeves Paul S., Philadelphia.	30
Bricks, Machines of.	30
Mosley Iron Works, 123 Chambers, N. Y.	30
Butcher and Shoe Knives, Manufacturers of.	30
Wilson John, Sheffield, England.	30
Bulls and American Spiral Spring Bolt Co., 32 Beekman, N. Y.	30
New England Bolt Co., 32 Platt, N. Y.	30
Sabin Mfg. Co., 123 Chambers, N. Y.	30
Stanley Works, New Britain, Conn.	30
Union Mfg. Co., 98 Chambers, N. Y.	30
Carriage Hg.	30
Townsend, Will & Hubbard, Philadelphia.	30
Carriage Hardware, Makers of.	30
Pin Richard F., Wilmington, Del.	30
Smith H. D. & Co., Plantville, Conn.	30
Wilcox & Howe, Birmingham, Conn.	30
Carriage Springs, Makers of.	30
Dexter Spring Co., Hulton, Pa.	30
Car Axles.	30
Roberts A. P. & Co., 25 8th, Philadelphia.	30
Carriages.	30
Schuyler, Hartley & Graham, New York.	30
Casters.	30
Clark Geo. P., Windsor Locks, Conn.	30
Glass Ball Caster Co., 60 John, N. Y.	30
Phoenix Caster Co., Indianapolis, Ind.	30
Caulking Irons.	30
Carver John, 28 Monroe, N. Y.	30
Chisels, Manufacturers of.	30
Buck Bros., Millbury, Mass.	30
Chucks.	30
Cushman A. F., Hartford, Conn.	30
Too E. Horton & Son Co., Windsor Locks, Conn.	30
Clock Springs, &c.	30
Cary & Moon, 24 W. 25th, N. Y.	30
Dunbar Bros., Bristol, Conn.	30
Coal, Miners of.	30
Ely R. & Co., New York.	30
Pardee A. & Co., 11 Broadway, N. Y.	30
The Hoboken Coal Co., Jersey City, N. J.	30
Coal Hods.	30
Enterbrook Wm., 41 Cherry, Phila.	30
Coal Vases.	30
Shepard Sidney & Co., Buffalo, N. Y.	30
Coffee and Spice Mills.	30
Lane Brothers, Millbrook, N. Y.	30
Enterprise Mfg. Co., Philadelphia, Pa.	30
Coke.	30
Walter Francis, 230 3rd, Phila.	30
Compagnies and Dividers, Manufacturers of.	30
Semla & Call Hdw. & Tool Co., Springfield, Mass.	30
Copper.	30
Mercantile & Co., 57 Market st., Phila.	30
The New Haven Copper Co., 15 Pearl, N. Y.	30
Corn Huskers.	30
Chambers, Boring & Quinlan, Decatur, Ill.	30
Corrugated Iron.	30
Mosley Iron Bridge and Roof Co., 5 Day, N. Y.	30
Counterparts.	30
Barber D. E., 121 Washington, Boston.	30
Cradles, Crails.	30
Grant Fan Mill and Cradle Co., Melrose, N. Y.	30
Crabblers, Manufacturers of.	30
Wile, Sidel & Co., 79 Market, Phila.	30
Cutlery, Importers of.	30
Baker Herman & Co., 101 Duane, N. Y.	30
Clatworthy F. & W., 82 Chambers, N. Y.	30
Friedmann & Lauterjung, of Chambers, N. Y.	30
Cutlery, Manufacturers of.	30
Burkshaw Aaron, Peppercorn, Mass.	30
Goodell Company, Antrim, N. H.	30
Henry Seymour & Co., 123 Chambers, N. Y.	30
John Russell Cutlery Co., 90 Chambers, N. Y.	30
Meriden Cutlery, Meriden, Conn.	30
Rogers Wm., Wallingford, Conn.	30
The Lamsom & Goodnow Mfg. Co., 88 Chambers, N. Y.	30
Rogers Wm. & Son, Hartford, Ct.	30
Wallace Bros., Wallingford, Ct.	30
Dash Lumps.	30
White Mfg. Co., Bridgeport, Conn.	30
Differential Pulley Blocks.	30
Yale Lock Mfg. Co., New Haven, Conn.	30
Dinner Pail and Lanterns.	30
Hight Jos., Portchester, N. Y.	30
Displacement.	30
Leish Edw. R., St. Louis Elevator, St. Louis, Mo.	30
Door and Gate Springs.	30
Dunne P. H., 123 Chambers, N. Y.	30
Van Wagoner & Williams, 82 Beekman, N. Y.	30
Door Hg.	30
Iron Hg. & Co., New Haven, Ct.	30
Drilling Machines, Makers of.	30
Bornton & Plummer, Worcester, Mass.	30
Sellers Wm. & Co., Phila. and 75 Liberty st., N. Y.	30
Taft Geo. C., Worcester, Mass.	30
Thorne, De Haven & Co., Philadelphia.	30
Wiley & Russell Mfg. Co., Greenfield, Mass.	30
Drops, Forging.	30
Rose Wm. & Bro., West Philadelphia, Pa.	30
Merrill & Co., 56 Grand, N. Y.	30
Drops, Hammer.	30
The Stiles & Parker Press Co., Middletown, Ct.	30
Drops, Presses.	30
Recher & Pegg, New Haven, Conn.	30
Drop Tools, Makers of.	30
Boosher L. M., 66 Chambers, N. Y.	30
Electric Machines.	30
Weston Dynamo-Electric Machine Co., Newark, N. J.	30
Elevators.	30
Crane Bros. Mfg. Co., Chicago, Ill.	30
Stokes & Parrish, Philadelphia.	30
Elevator Buckets.	30
Rowland T. F., Brooklyn, N. Y.	30
Emory and Emery Wheels.	30
Irwin A. & Co., 123 Chambers, N. Y.	30
Lehigh Valley Emery Wheel Co., Weissport, Pa.	30
Engines, Air.	30
Sherill Roper Air Engine Co., 91 Washington, N. Y.	30
Engines, Gas.	30
Schlesinger, Schuman & Co., Philadelphia, Pa.	30
Engines, Locomotive.	30
Baldwin Locomotive Works, Philadelphia, Pa.	30
Engines, Steam.	30
Lane & Loder Co., Cincinnati, O.	30
Lovegrove & Co., Philadelphia.	30
Shaper & Walla, Richardson, N. Y.	30
Wetherill Robt. & Co., Chester, Pa.	30
Equalizers.	30
Bunger E. & Co., Indianapolis, Ind.	30
Brushes, Frames, Makers of.	30
McNab & Harris Mfg. Co., 98 John, N. Y.	30
Faucets, Wood.	30
Penfield Block Works, Lockport, N. Y.	30
Faucets, Self-Working, Makers of.	30
Enterprise Mfg. Co., Phila. and N. Y.	30
Lane Bros., Millbrook, N. Y.	30

Files, Importers of.	30
Carr J. & Riley, 82 John, N. Y.	30
Moss F. W. & John, N. Y.	30
Files, Manufacturers of.	30
Albion File Works, 86 Chambers, N. Y.	30
Barnett G. & H., 41 and 43 Richmond, Phila.	30
Dunston Henry & Sons, Phila.	30
Draper C. T., Sing Sing, N. Y.	30
Everhart James M., Scranton, Pa.	30
Johnson & Bro., 1 Commercial, Newark, N. J.	30
McCaffrey & Bro., 123 and 125 N. 4th, Phila.	30
Nicholson File Co., Providence, R. I.	30
Nichol Chas. B., Williamsburgh, N. Y.	30
Spanner J. B. & Son, Sheffield, England.	30
Fire Arms.	30
Conway T. G., 90 Chambers, N. Y.	30
Fire Brick, Makers of.	30
Borgner & Co., Philadelphia, Pa.	30
Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y.	30
Garner Brothers, Pa.	30
Hall & Sons, Buffalo, N. Y.	30
Kreischer B. & Sons, 86 Goreck, N. Y.	30
Maurer Henry, 48 East 2d, N. Y.	30
Newton & Co., Albany, N. Y.	30
Ostrander James & Son, Troy, N. Y.	30
Perth Amboy Terra Cotta Co., Perth Amboy, N. J.	30
Valentine M. D. & Bro., Woodbridge, N. J.	30
Watson John R., Perth Amboy, N. J.	30
Flint and Emery Paper and Cloth.	30
Isaacs, Adams & Co., 730 Market, Phila.	30
Fluting Machines.	30
Shepard Hardware Co., Buffalo, N. Y.	30
Forges, Portable, &c.	30
Buffalo Forge Co., Cohoes, N. Y.	30
Empire Portable Forge Co., Cohoes, N. Y.	30
Keystone Portable Forge Co., 218 Carter, Phila.	30
Foundry Castings.	30
Brown T. J., Rockwood, Tenn.	30
Foundry Facings.	30
Whitehead Bros., 417 W. 15th, Phila.	30
Fry Pans.	30
Y. Stamping Co., 111 Avenue A, N. Y.	30
Furnaces, Makers of.	30
Richmond & Potts, 123 S. 4th, Phila., Pa.	30
Farmer & Sons, 254 Chambers, N. Y.	30
Carey & Moon, 254 W. 25th, N. Y.	30
Haigh J. Lloyd, 81 John, N. Y.	30
Garvin Lloyd, 81 John, N. Y.	30
Lefferts Marshall, 81 Beekman, N. Y.	30
Garden Tools.	30
Enterprise Mfg. Co., 43 Chambers, N. Y.	30
Enterprise Mfg. Co., Geneva, Ohio.	30
Gearing.	30
Comly J., Lincoln Park, N. J.	30
Governors.	30
Judson Junius & Son, Rochester, N. Y.	30
Grinding Stones.	30
Wood H. S. & Co., 31 West, N. Y.	30
Wood Water R., 25 and 26 Front, N. Y.	30
Worthington & Sons, North Amherst, Ohio.	30
Gunpowder, Makers of.	30
Kneeland F. L., (Dupont) 70 Wall, N. Y.	30
Laffin & Co., 209 Murray, N. Y.	30
Handies, Makers of.	30
Hartigan Wm. R., Burlington, Conn.	30
Hudson & Hanks, 73 Reade, N. Y.	30
Hangers.	30
Kidder Slide Door Hanger Co., Romeo, Mich.	30
Hardware Commission Merchants.	30
Shepard Hardware Co., Buffalo, N. Y.	30
Graham & Haines, 113 Chambers, N. Y.	30
Heston & Denckla, 57 Commerce, Phila.	30
Hundley & Hanks, 73 Reade, N. Y.	30
Samuel S. L., 4 Cedar, N. Y.	30
Tennis & Wilson, 82 Beekman, N. Y.	30
Wabridge R. R., 123 Chambers, N. Y.	30
Whitely John R. & Co., London and Paris.	30
Hardware Dealers.	30
Shepard Sidney & Co., Buffalo, N. Y.	30
Hardware Importers.	30
Baker Herman & Co., 101 Duane, N. Y.	30
McCoy & Co., 134 and 136 Duane, N. Y.	30
Hardware Manufacturers.	30
Baker Herman & Co., 101 Duane, N. Y.	30
Coulter, Flagler & Co., 53 Chambers, N. Y.	30
Cowles Hardware Co., Unionville, Conn.	30
Day, Farrington & Co., 33 Third, N. Y.	30
Enterprise Mfg. Co., Phila.	30
Greenfield Tool Co., Greenfield, Mass.	30
Lloyd & Watson, 123 Chambers, N. Y.	30
Miller's Falls Co., 74 Chambers, N. Y.	30
Payson Mfg. Co., 120 W. Jackson, Chicago.	30
Phila. Novelty Mfg. Co., 81 Cherry, Phila.	30
Russell & Erwin Mfg. Co., New York.	30
Shannon J. B. & Sons, 100 Market, Phila.	30
Stanley Works, New Britain, Conn.	30
Star Salt Caster Co., Boston.	30
Tiebout W. & J., 290 Pearl, N. Y.	30
Trenton Lock & Hardware Co., Trenton, N. J.	30
Union Mfg. Co., 98 Chambers, N. Y.	30
Van Wagoner & Williams, 82 Beekman, N. Y.	30
Hardware Specialties.	30
American Machine Co., 102 N. 4th, Phila.	30
American Tool Co., 113 Chambers, N. Y.	30
Shepard Hardware Co., Buffalo, N. Y.	30
Shepard Sidney & Co., Buffalo, N. Y.	30
Spencer & Underhill, 45 Chambers, N. Y.	30
Devoy & Paine Novelty Works, Trenton, N. J.	30
Weeks A. A. & John, N. Y.	30
Harness Snaps.	30
Gover Mfg. Co., West Troy, N. Y.	30
Hay Knives.	30
Holt Hiram & Co., East Wilton, Me.	30
Hinges.	30
Stanley Works, New Britain, Conn.	30
Hog Ringers.	30
Chambers, Boring & Quinlan, Decatur, Ill.	30
Housing Engines, Makers of.	30
Crane Bros. Mfg. Co., Chicago, Ill.	30
Harvie A. J., 81 Newark, N. J.	30
Holding Machines.	30
Box Alfred & Co., 312 Green, Phila.	30
Clegh & More, 417 Cherry, Philadelphia, Pa.	30
Harrington Edwin & Son, Philadelphia, Pa.	30
Sellers Wm. & Co., Phila. and 75 Liberty st., N. Y.	30
Hollow Chills, Rollers.	30
Totten & Co., Pittsburgh, Pa.	30
Hollow Ware.	30
W. T. Wells, 72 Beekman, N. Y.	30
Hooks (Cotton & Bale).	30
New York Handle & Mallet Works, 45 E. Houston.	30
Horse Clippers.	30
Baker Herman & Co., 101 Duane, N. Y.	30
Clark W., 232 Oxford, London, England.	30
Horse Nails, Makers of.	30
Enterprise Horse Nail Co., Warren, N. Y.	30
Bridgewater Iron Co., Bridgewater, Mass.	30
EP Nail Co., Cleveland, O.	30
National Horse Nail Co., Vergennes, Vt.	30
Putnam Nail Co., Boston.	30
Saranac Horse Nail Co., Plattsburg, N. Y.	30
Horse Shoes, Makers of.	30
Burden Iron Works, Troy, N. Y.	30
Rhode Island Horse Shoe Co., Providence, R. I.	30
Schlenker & Co., Pittsburgh, Pa.	30
Housefurnishing Goods.	30
Herce Geo. N., Buffalo, N. Y.	30
Hydrants, &c.	30
McLean John, 30 Monroe, N. Y.	30
Isaiah & Hudson Mfg. Co., Waterford, N. Y.	30
Hydraulic Jacks.	30
Dudgeon Richard, 24 Columbia, N. Y.	30
Lyon E. & Co., 47 Grand, N. Y.	30
Ice Cream Freezers.	30
White Mountain Freezer Co., Lacombe, N. H.	30
Ice Creepers.	30
Childs, Groat & Co., Cleveland, Ohio.	30
Insurance, Boiler.	30
Hartford Steam Boiler Inspection & Insurance Co.	30
Iron Brokers.	30
Boynton Geo. A., 72 Wall, N. Y.	30
Etting Edward J., Philadelphia, Pa.	30
Hasty A. G., Pittsburgh, Pa.	30
Iron, Charcoal, Warm or Cold Blast.	30
Quincy John W., 68 William, N. Y.	30
Iron Commission Merchants.	30
Bailey J. F. & Co., 52 Wall, N. Y.	30
Low S. B., Chattanooga, Tenn.	30
Wagner J. J., 81 Wall, N. Y.	30
Mohr J. J., 430 Walnut, Philadelphia.	30
Richardson J. O., 323 Dock, Philadelphia.	30
Water R., 25 and 26 Front, N. Y.	30
Iron, Pig, Importers of.	30
Swan John E. & Bro., Glasgow, Scotland.	30
Iron Dealers.	30
Abert Brothers, 120 South, N. Y.	30
Borden James C., 9 Wall, N. Y.	30
Boswell & Co., 120 South, N. Y.	30
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Boswell & Co., 120	

HENRY DISSTON & SONS

KEYSTONE SAW, TOOL,



STEEL and FILE WORKS,

Front and Laurel Streets, Philadelphia,

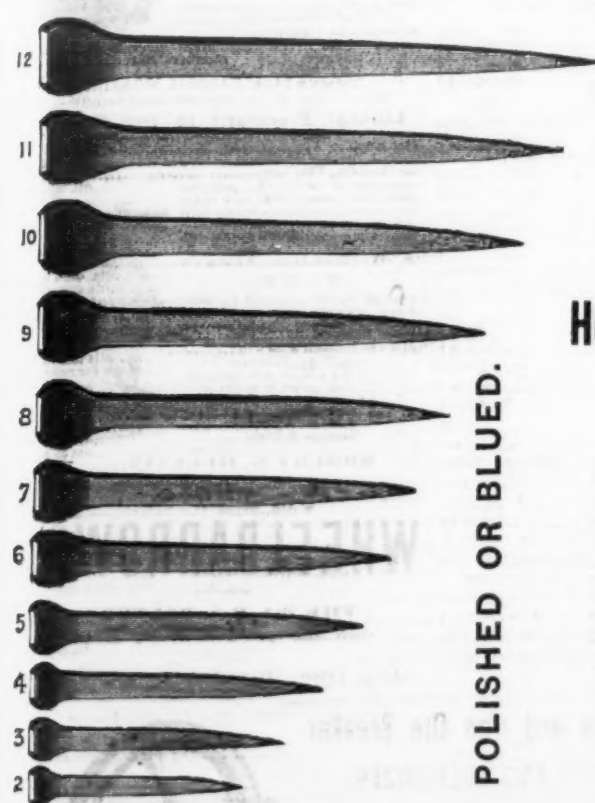
MANUFACTURERS OF

SAWS OF ALL KINDS, FILES AND TOOLS, AND SPECIAL GOODS MADE FROM SHEET STEEL

All goods stamped Henry Disston & Sons, and bearing our trade mark, are fully warranted.

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POLISHED OR BLUED.

AUSABLE HORSE NAILS,

Twisted, Bent and Drawn COLD.

Hot Forged and Cold Hammered Pointed,

Are the only Nails in market that are made in imitation of the Hand Process. They have the uniformity of Machine Nails and the toughness of those hammered by hand. Our

HOT FORGED AND COLD HAMMERED POINTED NAILS

Are the Standard Nails,

and are acknowledged to be the best in the market. They are used by the best shoers in New York, Brooklyn, Philadelphia, Chicago, Saint Louis, Milwaukee, Baltimore, &c., and

GENERALLY THROUGHOUT THE UNITED STATES.

They also compete successfully in Foreign Countries with machine and hand-made Nails of their own manufacture.

AUSABLE HORSE NAIL CO.,

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Pawtucket, R. I.

MANUFACTURERS OF

COACH SCREWS

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

AND
TAP BOLTS.



Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

Iron and Brass Wood Screws.

We manufacture a full line of

IRON AND BRASS SCREWS.

Quality, finish and tests as to strength, guaranteed equal to any in the market. With improved facilities and largely increased capacity for production, we hope to fill orders promptly.

Philadelphia Screw Co.,

Twelfth and Buttonwood Streets,
PHILADELPHIA.



HOLIDAY GOODS.



Small boxes of excellent Tools, all warranted.

Price, in sets, from \$1 to \$3, in Pasteboard, Chestnut and Black Walnut Boxes.

ALSO,

AMATEURS' CARVING TOOLS.

No. 5, \$4.50 per doz.



No. 3, \$4.80 per doz.



Of the best quality. All handled and ground sharp. Put up in sets of 3, 4, 6, 8, 10 and 12 tools. These tools are all made by hand, and are forged from the best quality cast steel, and every tool is stamped with our name.

BUCK BROTHERS,

RIVERLIN WORKS. - - - Millbury, Mass.

Penfield Block Works,

LOCKPORT, N. Y.,

Wrought Iron and Wood Shell

TACKLE BLOCKS.

All Steel Roller Bushings, and Roller Bushed Iron Sheaves.

CARPENTER MALLETS

Of every description.

Giant Car Pusher and Faucets.



Send for Catalogue.



Bergen Port Spelter

MINES: Lehigh Valley, Pa. WORKS & FURNACES: Bergen Port, N. J.

The only Miners and Manufacturers of

PURE

LEHIGH

SPELTER

From Lehigh Ore.

Especially adapted for

Cartridge Metal and German Silver.

Also manufacturers of

BERGEN PORT OXIDE ZINC.

Superior for Liquid Paint on account of its body and wearing properties.

F. OSGOOD & CO., Proprietors.

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MANUFACTURER OF

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PUMPS

ERIE, PA.

ESTABLISHED - 1856

Warranted Genuine

Cucumber Pumps & Pipes. Also Pop

Pumps, Lined Pumps, &c.

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SCOBIE, HARRISON & PARKER,

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KNECHT & THOMAS,

Winchester, Ind.

—AND BY—

A. B. GUNNISON

Manufacturer, ERIE, PA.



THE "EDDY" STRAIGHTWAY

VALVES.

ALSO,

FIRE HYDRANTS.

Axe, Hatchet, Powder and

Brush Machinery.



MOHAWK & HUDSON MFG. CO.

WATERFORD, N. Y.

BENTON, FAULKNER & BIRD, 16 New Church

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GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

FOR ALL PURPOSES.

351 to 363 Cassen Ave. Brooklyn, N. Y.

New York Wholesale Prices, November 19, 1879.

HARDWARE.

Angie Anvils (American).....	\$ 90	dis 30%
Archie's.....	\$ 7	nolge over 20 lbs 18c
Armature's Mouse Hole.....	916 40 940
Traction.....	1040
Augers and Bits.		
Conn. Valley Mfg Co.....	
Douglasmf J. Co.....	
Humphreysville Mfg Co.....	
Ives.....	dis 40kto %
Beecher (French, Swift & Co.).....	
Glewood.....	
Nobles Mfg. Co.....	
Fasson's Patent.....	
Cook's, Douglas Mfg Co.....	dis 50 %
Cook's, Ives'.....	dis 50 %
Snell Mfg Co., C. S. Augers.....	dis 40kto %
" " B. Machine.....	dis 40kto %
" " C. S. Bits.....	dis 40kto %
" " Jennings's Bits.....	dis 35 %
Patent Solid Head.....	dis 50 %
Russell Jennings' Auger Dowel, Machine, Dowel and Hand-Rail Bits.....	dis 10kto 10 %
Russell Jennings' Augers.....	dis 10kto 10kto %
Russell Jennings' Car and Machine Bit, Boring, Machine and Millwrights' Augers dis 5kto kto kto Imitation Jennings's Bits.....	dis 40kto %
Ives' "Jennings'" Bit.....	dis 35kto %
Lewis' Single Twist Bits.....	dis 50 %
Andrews Bits.....	dis 50 %
Extensive Bits, Clark's, small, \$1.10, \$1.50, \$2.00.....	
" " Ives.....	\$2.00 40-45 32% %
" " Blake's.....	\$2.00-40 40 %
" " Parmelee's.....	\$2.00 and \$2.00 45 32% %
Hollow Augers Ives'.....	dis 50 %
" French Swift & Co.....	dis 50 %
" " Douglas.....	dis 50 %
" Bonner's Adaptor.....	\$1.00 45 40 %
" Niagara Adjuster.....	\$1.00 45 40 %
" Ives' Expansive.....	each \$4.00 50 30 %
" " Universal Expansive, each \$4.00-50 30 %	
Gimlet Bits.....	\$7.50 45 40 %
" " Diamond.....	\$7.00 45 40 %
" " Bee.....	\$7.00 45 40 %
Double Cut Gimlet Bits Shepardson's.....	dis 40 %
" " Hart Valley Mfg. Co.....	dis 40 %
" " Et. Walley's.....	dis 40 %
" " Douglas.....	dis 40 %
" " Ives.....	dis 50 %
Morse's Bit Stock Drill, List of May 15, '78.....	dis 25 %
Lt. Hammond's Ship Augers.....	dis 15 %
Watrous Ship Augers.....	dis 15 %
Awl Hints.		
Sewing, Brass Ferrule.....	\$1.50	gross-dis 40kto %
" " ".....	3.50	dis 40kto %
Patent Sewing, Short.....	\$1.00	gross-dis 40kto %
" " Long.....	\$1.40	dos-dis 10 %
" Peg Plain Top.....	\$1.00	gross-dis 40kto %
" " Leather Top.....	12.00	dis 40kto %
Awls, Brad Sets, &c.		
" Sewing, Best.....	gross \$1.35-	dis 25 %
" Sewing, Best.....	gross 1.40-	dis 10 %
" Shouldered Peg.....	gross 1.25-	dis 10 %
" Patent Fox.....	gross 1.50	dis 15 %
" Shouldered Brad.....	gross 2.00-	dis 25kto %
" Handled Brad.....	gross .75-	gross-dis 40kto %
" Handled Scratch.....	gross .75-	gross-dis 40kto %
" Socket Scratch.....	gross .25-	dis 40kto %
Brad Sets, Allen's.....	No. 4, \$1.50 No. 4, \$1.50	dis 40kto %
" " Stanley's Excelsior, No. 1, \$2.00.....	dis 40kto %
" " ".....	No. 2, 4.00.....	dis 25kto %
" " ".....	No. 5, 7.00.....	dis 25kto %
Axes.		
" Light.....	Med. Heavy.....	
J. Jones & Co.....	\$4.00 \$4.50 \$5.00	gross-net
Blacksmiths.....	16.00 18.00 15.00.....	dis 35 %
Axles.		
Common (Gay C. Hotchkiss, Field & Co.).....	\$ 35c
Old Collar, Case Hardened, Chilled Box.....	\$ 70c
Alvin Greenlee, Frasers'.....	\$ 70c
Baincases.		
All Spring Balance.....	dis 20kto %
Bells.		
Hand, Light Brass.....	dis. 75 %
" Extra Heavy.....	dis. 45 %
" White Metal.....	dis 30kto %
" Silver Chime.....	dis 20kto %
" Glove (Cone's Patent).....	dis 20kto %
Long, Abbe's.....	dis 20kto %
" Yankee.....	dis 50kto %
" Barton's.....	dis 50kto %
Frank Taylor's.....	dis 50kto %
" Brook's.....	dis 50kto %
" Cone's.....	dis 10 %
" Common.....	dis 50kto %
Ver, Sargent's new list Dec. '78.....	dis 60kto %
" Taylor's Bronze or Plated Lever.....	net
" " Japanese Lever.....	dis 25kto %
" R. & E. M. Coggs.....	dis 50kto %
all, Brook's.....	dis 50kto %
" Western.....	dis 20kto %
W. Common wrought.....	dis 25 %
" Western.....	dis 20kto %
" Sargent's new list.....	dis 20kto %
" Kentucky "Star".....	dis 20kto %
" Sargent's new list.....	dis 40kto %
Dodge's Genuine Coggs.....	new list	
No. 4.....	3 4 5 6 7 8 9 10 Hog	dis
" 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100	dis
Yaw's Genuine.....	dis
Texas.....	dis 20kto %
Wilson's (Moore's).....	dis
Bellows.		
Blacksmiths' Common.....	dis 45 %
" " Extra and Pittsburgh Pattern.....	dis 20 %
Boulders.....	dis 35 %
and Bellows.....	dis 25 %
Belted Rubber.		
E. Belting and Packing Co.....	new list net
Bit Holders.		
Extension, Barber's.....	gross \$1.00-	dis 40kto %
" " Ives.....	gross \$1.00-	dis 40 %
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Punches.
 Bolt or Drive... \$1.25
 Remis & Call... \$1.25
 Springfield Socks... \$1.25
 Spring... \$1.25
 Remis & Call Co.'s Spring and Check... \$1.25
 Solid Tinner's... \$1.25

Rail.
 Building Door Wrought Brass... \$1.25
 Barn Door, 1/2 inch... \$1.25
 for N. E. Hangers... \$1.25

Rollers.
 Genuine Emerson... \$1.25
 Badger's Emerson... \$1.25
 Badger's (not Emerson)... \$1.25
 Evans... \$1.25
 Emerson... \$1.25
 Hunt's... \$1.25
 Champion... \$1.25
 Remis & Call... \$1.25
 Torrey's... \$1.25

Rivet Sets.
 Iron and Tinned... \$1.25
 in bulk... \$1.25
 Copper Rivets and Bars... \$1.25
 Nos. 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Rods.
 American Patent... \$1.25
 New list, March 1, '79, dis 25

Rollers.
 Iron Door, Sargent's list... \$1.25
 Novelty... \$1.25
 Acme (Anti-Friction) list... \$1.25

Ropes.
 Manila... \$1.25
 Tarred Rope... \$1.25
 Hay Rope... \$1.25
 Seal... \$1.25
 Hay Rope... \$1.25

Rules.
 Chapin's... \$1.25
 Standard... \$1.25
 Stanley... \$1.25
 Stephens... \$1.25
 Willis Thru & Son... \$1.25

Sand Paper.
 Bader & Adamson's list... \$1.25
 Assorted... \$1.25
 Star... \$1.25
 Emery... \$1.25
 New England, same list as B. & A. Flint... \$1.25
 Gase's... \$1.25

Sash Cord.
 Common... \$1.25
 Patent... \$1.25
 Silver Lake... \$1.25
 White Cotton... \$1.25
 Drab Cotton... \$1.25

Sash Locks.
 Clark's, No. 1, \$1.00; No. 2, \$1.00 per gross... \$1.25
 Peterson's... \$1.25
 Walker's... \$1.25
 Hammond's Window Springs... \$1.25
 Northup Window Springs... \$1.25
 The Perfect, Clark & Smith, Plain Jap'd... \$1.25
 Nickel-Plated... \$1.25

Sash Weights.
 Solid Iron... \$1.25
 Messing Sashers or Fillers... \$1.25
 Miles... \$1.25
 Perry... \$1.25
 Pratt Cut No. 1... \$1.25
 Enterprise Mfg. Co... \$1.25
 Silver... \$1.25

Saws.
 Dismantle's Circular... \$1.25
 Mill... \$1.25
 Cross Cut... \$1.25
 Hand, Panel, Rip, &c... \$1.25
 Boynton's Lightning Cross Cuts, new list... \$1.25
 One-Man, all lengths... \$1.25
 Billet Weis, 20 in... \$1.25
 Lightning Buck Saw X Bar... \$1.25
 Wheeler & Clemson Mfg. Co.'s Hand... \$1.25
 Lightning Hand and Pruning... \$1.25
 Livingston's Butcher and Kitchen... \$1.25
 Framed Wood... \$1.25
 Nos. 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200

Saw Frames.
 White, Vermont... \$1.25
 Red, Polished and Varied... \$1.25
 Saw Bods... \$1.25

Saw Sets.
 Boynton's Patent X Cut, per doz. \$12.00; Hand Saw... \$1.25
 Stillman's... \$1.25
 Common Lever... \$1.25
 Leach's... \$1.25
 Nash's... \$1.25
 Hammer, Hotchkiss... \$1.25
 Remis & Call Co.'s Lever & Spring Hammer... \$1.25
 Aiken's Genuine... \$1.25
 Remis & Call... \$1.25
 Hart's Patent Lever... \$1.25
 Dismantle's... \$1.25

Scissors.
 Hatch, Counter, No. 171... \$1.25
 No. 191... \$1.25
 Union Patent... \$1.25
 Fairbanks... \$1.25
 Howe's... \$1.25
 Chastillon's Groceries... \$1.25
 Eureka... \$1.25
 Family Universal... \$1.25
 Favorite... \$1.25
 Turnbull's... \$1.25
 Scale Beams, Chastillon's list... \$1.25
 Sargent's list... \$1.25

Scissors.
 Adjustable Box Scraper (R. L. & L. Co.)... \$1.25
 Box, 1 Handle... \$1.25
 Defiance Box and Ship... \$1.25
 Foot... \$1.25
 Ship common... \$1.25
 Providence Tool Co... \$1.25

Screw Drivers.
 Dismantle's Mfg. Co... \$1.25
 Dismantle's... \$1.25
 Buck Bros... \$1.25
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 Flat Head Iron... \$1.25
 Round Head Iron... \$1.25
 Flat Head Brass... \$1.25
 Round Head Brass... \$1.25
 Brass and Silver Capped... \$1.25
 Japanned, list of Plain Screws... \$1.25
 Lat or Common Coach... \$1.25
 Coach Patent Gimlet Point, list per 100... \$1.25
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 R. & E. list... \$1.25
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Shovels and Spades.
 Ames, New list, Jan. 1, '79, with changes of Oct... \$1.25
 Ramsey, Hines & Co. Patent... \$1.25
 Old Colony (changes in list Oct. 15, '79)... \$1.25
 Remington's (Lowman's) Patent... \$1.25
 Remington's Shovels and Spades... \$1.25
 Howard's... \$1.25
 Oxford Patent... \$1.25

Shovels and Tongs.
 Iron and Brass Head, R. & E. list... \$1.25
 Polished Steel... \$1.25
 Square Frames, Round Corners, by case... \$1.25
 Less than a case... \$1.25

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 Distance Metallic... \$1.25
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 Bonney's... \$1.25
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 (P. S. & W.), Teas... \$1.25
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 Star Try Squares and Bevels... \$1.25
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 List of Oct. 31, 1879... \$1.25
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 Reed's Brick and Plastering... \$1.25
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 Wilson's... \$1.25
 Howard's... \$1.25
 Merrill's... \$1.25
 Sargent's... \$1.25
 Treston... \$1.25
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 Stevens... \$1.25
 Simpson's Adjustable... \$1.25

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 Protective Ventilator Co. s... \$1.25

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 Brass and Copper... \$1.25
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 No. 3... \$1.25
 No. 4... \$1.25
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 No. 97... \$1.25
 No. 98... \$1.25
 No. 99... \$1.25
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This is the most popular Coal Vase ever put upon the market.

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Eight Patterns.

All New Styles.

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NEW YORK WHOLESALE PRICES, NOVEMBER 19, 1879.

METALS.

IRON.—DUTY: Bars, 1 to 140, 15¢; Sheet, Band and Scrap, 15¢ to 140¢. 15¢ provided, that none of the above iron shall pay a less rate of duty than 15¢ per cent. Pig, 15¢; Wrought Sheet, 15¢; Wrought Scrap, 15¢; Wrought Scrap, 15¢; Railroad, 15¢; Boiler and Plate, 15¢.

Pig Iron.—AMERICAN NOMINAL.
Foundry No. 1, 15¢; No. 2, 14¢; No. 3, 13¢; No. 4, 12¢; No. 5, 11¢; No. 6, 10¢; No. 7, 9¢; No. 8, 8¢; No. 9, 7¢; No. 10, 6¢; No. 11, 5¢; No. 12, 4¢; No. 13, 3¢; No. 14, 2¢; No. 15, 1¢.

Gray Forge.—SCOTCH.
Eglington, 15¢; Coltness, 14¢; Glasgow, 13¢; Gartshore, 12¢.

Rails.
Iron, 15¢; Steel, 14¢; Old, 13¢.

Old Rails.—15¢.

Wrought Scrap, from yard.—15¢.

Star Iron, from Store.

Common Iron: 15¢ to 1 in. round and square, 15¢; 1 to 6 in. 14¢; 6 to 12 in. 13¢; 12 to 24 in. 12¢; 24 to 36 in. 11¢; 36 to 48 in. 10¢; 48 to 60 in. 9¢; 60 to 72 in. 8¢; 72 to 84 in. 7¢; 84 to 96 in. 6¢; 96 to 108 in. 5¢; 108 to 120 in. 4¢; 120 to 144 in. 3¢; 144 to 168 in. 2¢; 168 to 192 in. 1¢; 192 to 216 in. 10¢; 216 to 240 in. 9¢; 240 to 264 in. 8¢; 264 to 288 in. 7¢; 288 to 312 in. 6¢; 312 to 336 in. 5¢; 336 to 360 in. 4¢; 360 to 384 in. 3¢; 384 to 408 in. 2¢; 408 to 432 in. 1¢; 432 to 456 in. 10¢; 456 to 480 in. 9¢; 480 to 504 in. 8¢; 504 to 528 in. 7¢; 528 to 552 in. 6¢; 552 to 576 in. 5¢; 576 to 600 in. 4¢; 600 to 624 in. 3¢; 624 to 648 in. 2¢; 648 to 672 in. 1¢; 672 to 696 in. 10¢; 696 to 720 in. 9¢; 720 to 744 in. 8¢; 744 to 768 in. 7¢; 768 to 792 in. 6¢; 792 to 816 in. 5¢; 816 to 840 in. 4¢; 840 to 864 in. 3¢; 864 to 888 in. 2¢; 888 to 912 in. 1¢; 912 to 936 in. 10¢; 936 to 960 in. 9¢; 960 to 984 in. 8¢; 984 to 1008 in. 7¢; 1008 to 1032 in. 6¢; 1032 to 1056 in. 5¢; 1056 to 1080 in. 4¢; 1080 to 1104 in. 3¢; 1104 to 1128 in. 2¢; 1128 to 1152 in. 1¢; 1152 to 1176 in. 10¢; 1176 to 1200 in. 9¢; 1200 to 1224 in. 8¢; 1224 to 1248 in. 7¢; 1248 to 1272 in. 6¢; 1272 to 1296 in. 5¢; 1296 to 1320 in. 4¢; 1320 to 1344 in. 3¢; 1344 to 1368 in. 2¢; 1368 to 1392 in. 1¢; 1392 to 1416 in. 10¢; 1416 to 1440 in. 9¢; 1440 to 1464 in. 8¢; 1464 to 1488 in. 7¢; 1488 to 1512 in. 6¢; 1512 to 1536 in. 5¢; 1536 to 1560 in. 4¢; 1560 to 1584 in. 3¢; 1584 to 1608 in. 2¢; 1608 to 1632 in. 1¢; 1632 to 1656 in. 10¢; 1656 to 1680 in. 9¢; 1680 to 1704 in. 8¢; 1704 to 1728 in. 7¢; 1728 to 1752 in. 6¢; 1752 to 1776 in. 5¢; 1776 to 1800 in. 4¢; 1800 to 1824 in. 3¢; 1824 to 1848 in. 2¢; 1848 to 1872 in. 1¢; 1872 to 1896 in. 10¢; 1896 to 1920 in. 9¢; 1920 to 1944 in. 8¢; 1944 to 1968 in. 7¢; 1968 to 1992 in. 6¢; 1992 to 2016 in. 5¢; 2016 to 2040 in. 4¢; 2040 to 2064 in. 3¢; 2064 to 2088 in. 2¢; 2088 to 2112 in. 1¢; 2112 to 2136 in. 10¢; 2136 to 2160 in. 9¢; 2160 to 2184 in. 8¢; 2184 to 2208 in. 7¢; 2208 to 2232 in. 6¢; 2232 to 2256 in. 5¢; 2256 to 2280 in. 4¢; 2280 to 2304 in. 3¢; 2304 to 2328 in. 2¢; 2328 to 2352 in. 1¢; 2352 to 2376 in. 10¢; 2376 to 2400 in. 9¢; 2400 to 2424 in. 8¢; 2424 to 2448 in. 7¢; 2448 to 2472 in. 6¢; 2472 to 2496 in. 5¢; 2496 to 2520 in. 4¢; 2520 to 2544 in. 3¢; 2544 to 2568 in. 2¢; 2568 to 2592 in. 1¢; 2592 to 2616 in. 10¢; 2616 to 2640 in. 9¢; 2640 to 2664 in. 8¢; 2664 to 2688 in. 7¢; 2688 to 2712 in. 6¢; 2712 to 2736 in. 5¢; 2736 to 2760 in. 4¢; 2760 to 2784 in. 3¢; 2784 to 2808 in. 2¢; 2808 to 2832 in. 1¢; 2832 to 2856 in. 10¢; 2856 to 2880 in. 9¢; 2880 to 2904 in. 8¢; 2904 to 2928 in. 7¢; 2928 to 2952 in. 6¢; 2952 to 2976 in. 5¢; 2976 to 3000 in. 4¢; 3000 to 3024 in. 3¢; 3024 to 3048 in. 2¢; 3048 to 3072 in. 1¢; 3072 to 3096 in. 10¢; 3096 to 3120 in. 9¢; 3120 to 3144 in. 8¢; 3144 to 3168 in. 7¢; 3168 to 3192 in. 6¢; 3192 to 3216 in. 5¢; 3216 to 3240 in. 4¢; 3240 to 3264 in. 3¢; 3264 to 3288 in. 2¢; 3288 to 3312 in. 1¢; 3312 to 3336 in. 10¢; 3336 to 3360 in. 9¢; 3360 to 3384 in. 8¢; 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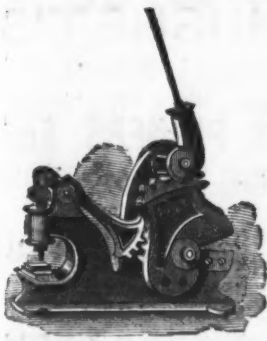
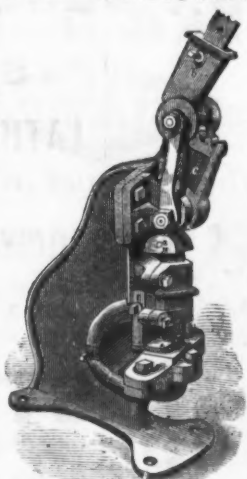
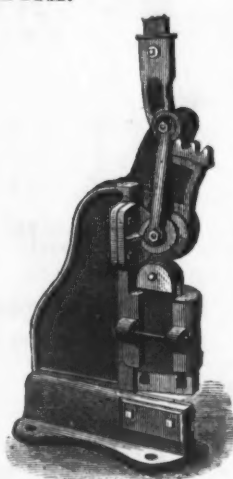
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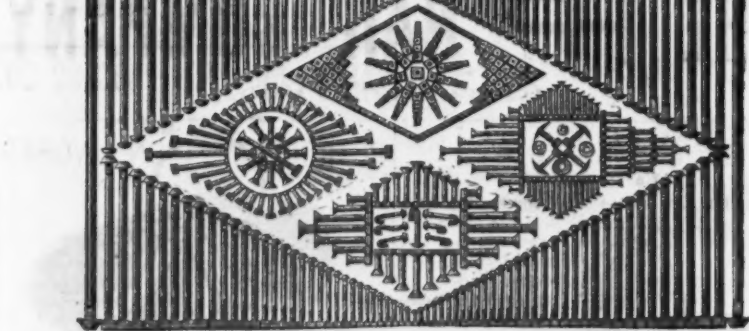
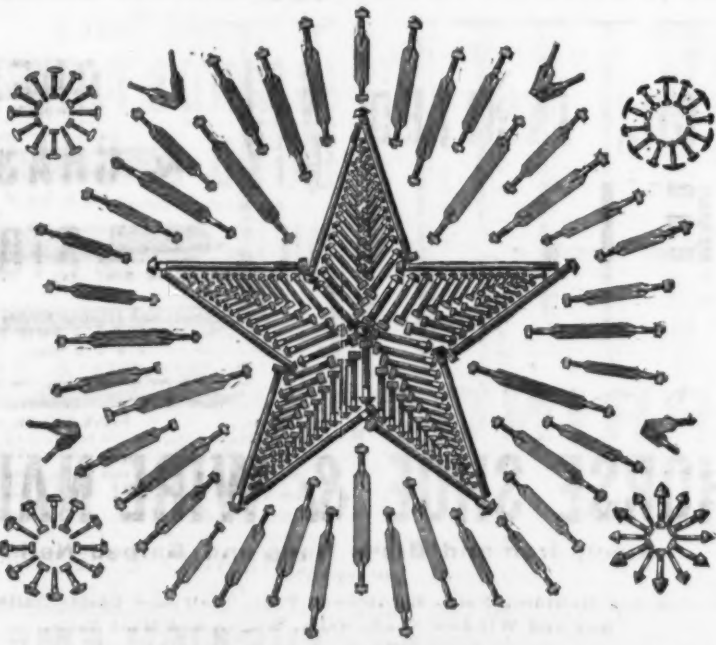


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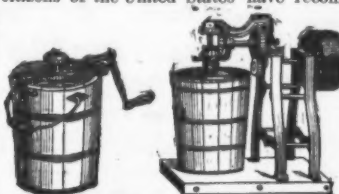
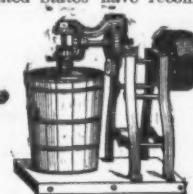
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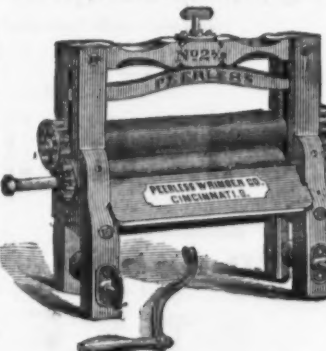
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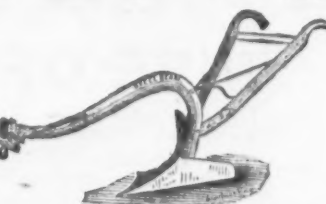
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The two cuts herewith given show the
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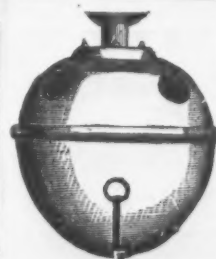
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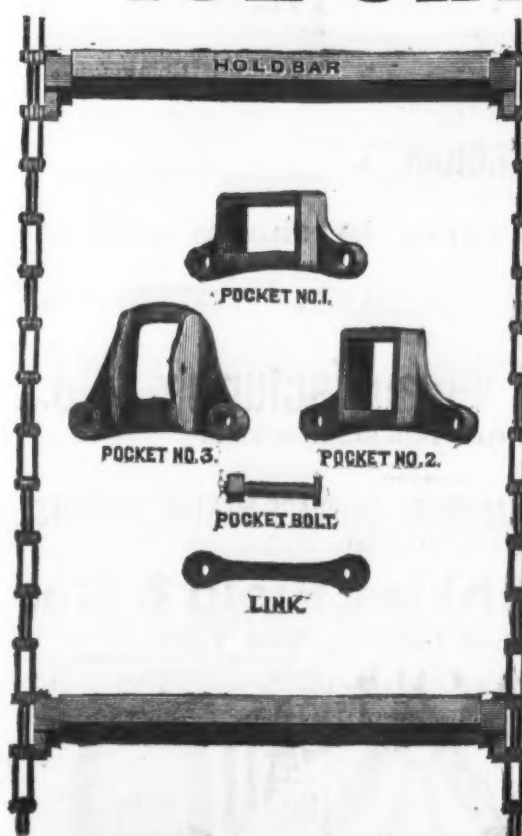
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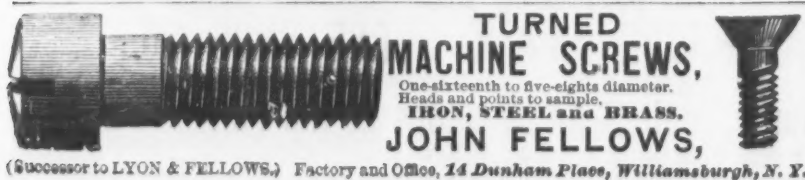
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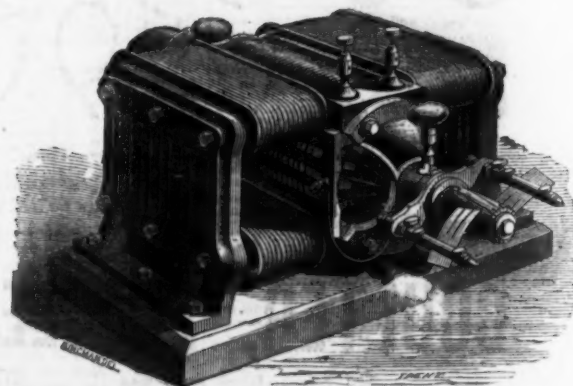
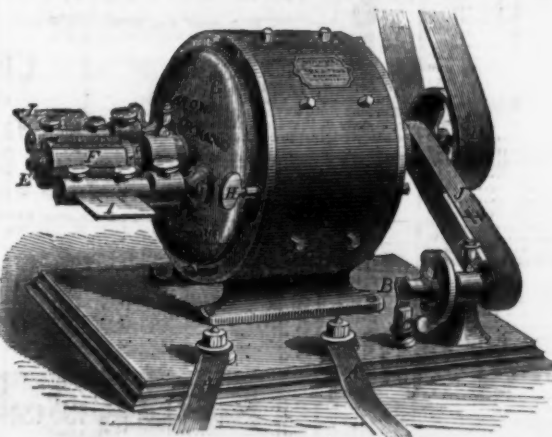
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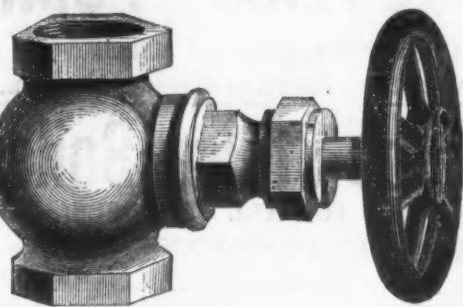
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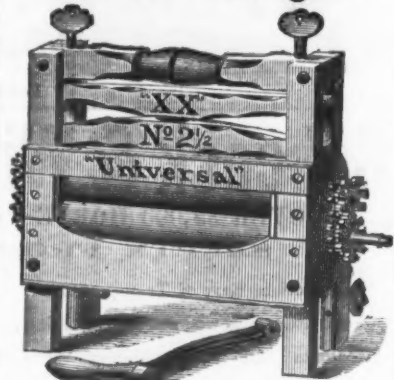
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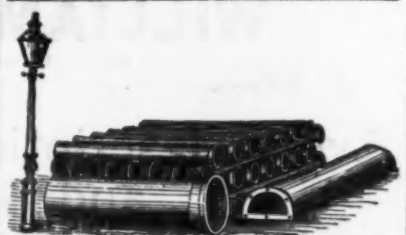
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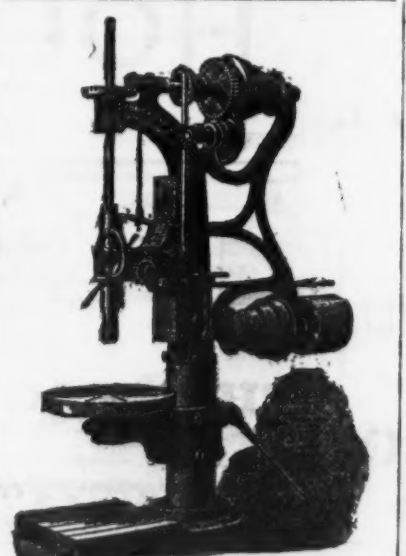
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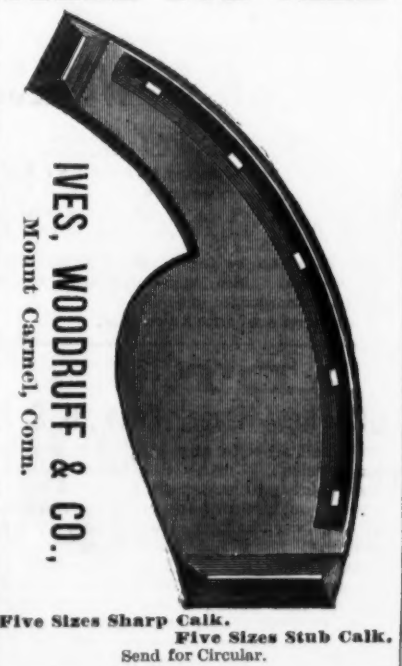
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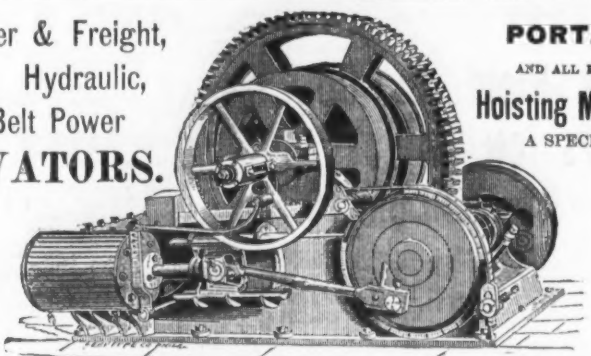
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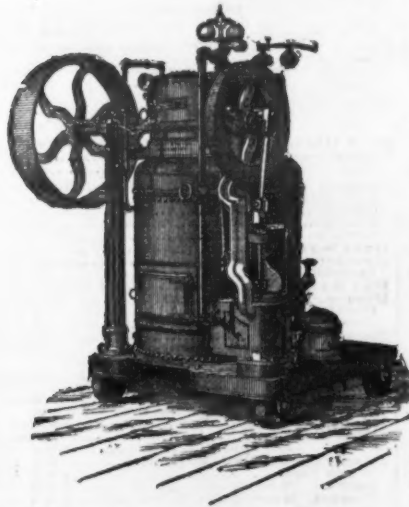
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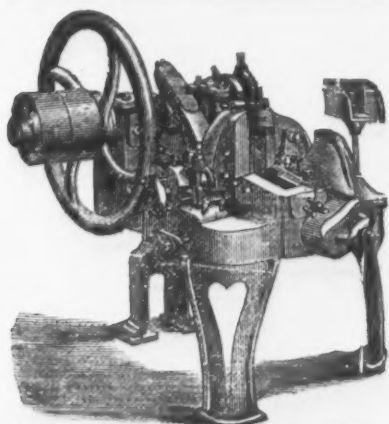
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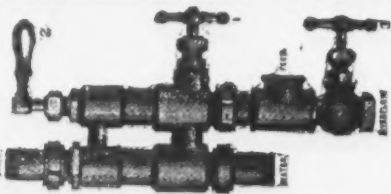
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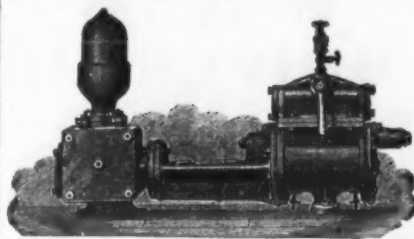
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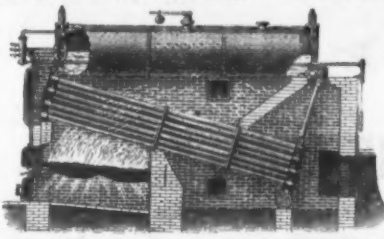
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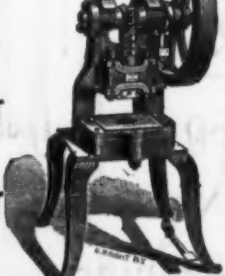
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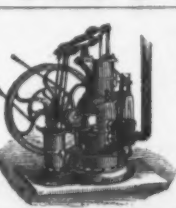


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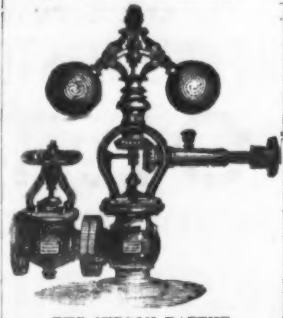
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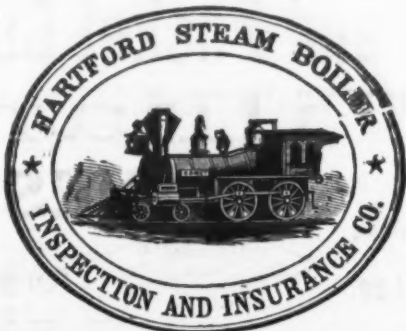
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3 1/2	27.00	31.00	2.75	7.50
4	31.00	37.00	3.25	9.00
4 1/2	35.00	41.00	3.50	11.00
5	40.00	46.00	3.75	12.00
5 1/2	45.00	52.00	4.25	14.00
6	54.00	62.00	4.50	17.00
6 1/2	64.00	73.00	5.00	21.00
7	74.00	84.00	5.50	25.00
7 1/2	84.00	95.00	6.00	31.00
8	97.00	109.00	6.50	37.00
8 1/2	112.00	125.00	7.00	44.00
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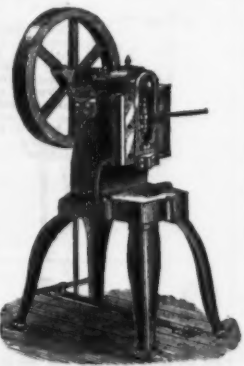
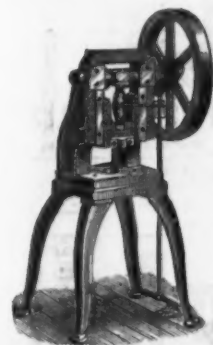
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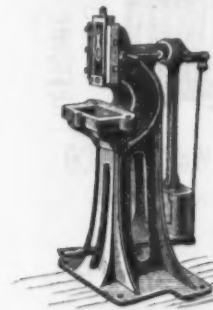
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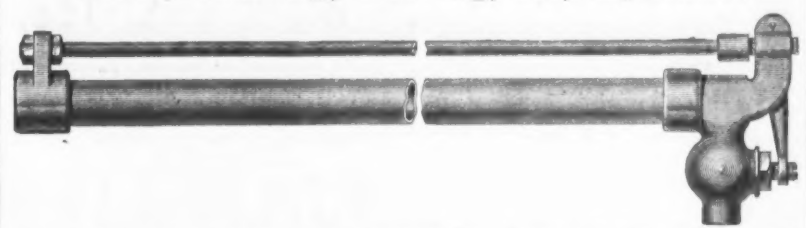


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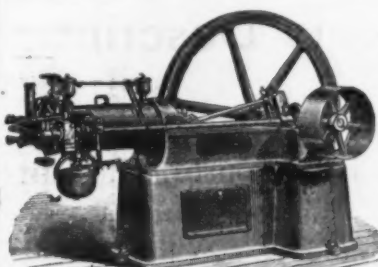
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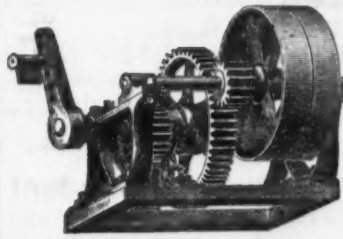
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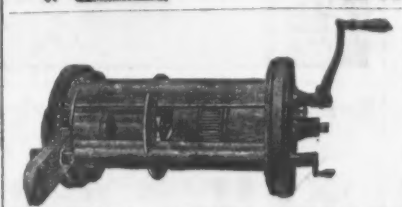
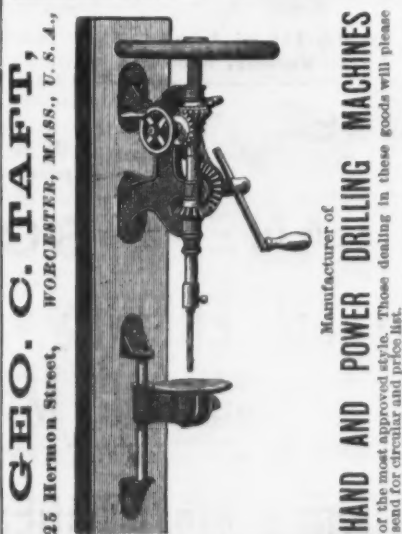
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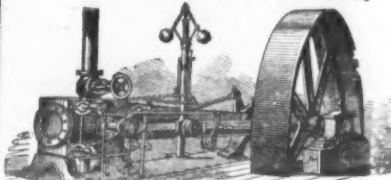
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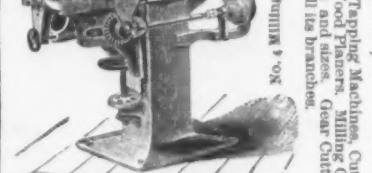
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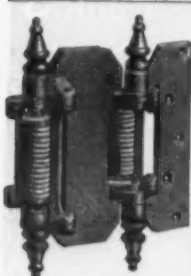


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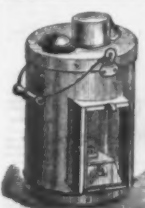
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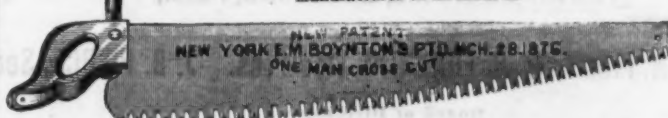


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TRIAL OF THE IMPROVED LIGHTNING SAW.
The Emperor Dom Pedro, accompanied by Director General Goshorn, Superintendent Albert, and others, visited Machinery Hall at the Centennial on the evening of June 28th. Among other things inspected, at the invitation of E. M. BOYNTON, of New York, they witnessed a trial of the New Lightning Saw, patented March 26, 1874. Two men, with one of these saws, cut off a sound log of gum-wood, one foot extreme diameter, in seven seconds, or at the rate of a cord of wood in five minutes. Messrs. Corlies, Morell, Lynch, and other members of the commission, witnessed the trial and timed the cutting. The Emperor remarked, "That was fast, very fast cutting." Last evening the Emperor made another examination of the saw. Philadelphia Press, June 29.

"Boynton's Saws were effectually tested before the judges at the Philadelphia Fair, July 6th and 7th. An ash log, 11 inches in diameter, was sawed off, with a 4 1/2 foot lightning cross cut, by two men, in precisely 6 seconds, as timed by the chairman of the Centennial Judges of Class Fifteen. The speed is unprecedented, and would cut a cord of wood in 4 minutes. The representatives of Russia, Austria, France, Italy, Spain, Belgium, Sweden, England, and several other countries, were present, and expressed their high appreciation." Received Medal and Highest Award of Centennial World's Fair, 1876. \$2000 challenge was prominently displayed for six months, and the numerous saw manufacturers of the world dared not accept it, or test in a competition so hopeless.

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